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THESIS

A MULTIVARIATE ANALYSIS
OF
ENLISTED ATTRITION IN THE ARMY RESERVE

By

Cynthia A. Albiso
and
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December 1985

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The purpose of this thesis was to investigate determinants of early attrition from the U.S. Army Selected Reserve enlisted forces. The sample was selected from fiscal year 1980 through 1982 cohort files maintained by the Defense Manpower Data Center. Selected Reserve enlisted personnel were divided into non-prior and prior service groups. Preliminary analyses were performed which identified significant differences between the two groups relative to the timing and destination of attrition losses. Bivariate analyses of stayer/leaver subgroups revealed significant differences on selected personal and occupational characteristics. Regression analyses were used to examine the influence of candidate explanatory variables on the logistic form of attrition. The variables examined were found to be significant in the analytical results;

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A Multivariate Analysis of Enlisted Attrition in the Army Reserve

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ABSTRACT

The purpose of this thesis was to investigate determinants of early attrition from the U.S. Army Selected Reserve enlisted forces. The sample was selected from fiscal year 1980 through 1982 cohort files maintained by the Defense Manpower Data Center. Selected Reserve enlisted personnel were divided into non-prior and prior service groups. Preliminary analyses were performed which identified significant differences between the two groups relative to the timing and destination of attrition losses. Bivariate analyses of stayer/leaver subgroups revealed significant differences on selected personal and occupational characteristics. Regression analyses were used to examine the influence of candidate explanatory variables on the logistic form of attrition. The variables examined were found to be significant in the analytical results; however, low explanatory power of the models tested indicated a need for reconfiguration of the data base to support future research.

THESIS DISCLAIMER

The reader is cautioned that computer programs developed in this research may not have been exercised for all cases of interest. While every effort has been made, within the time available, to ensure that the programs are free of computational and logic errors, they cannot be considered validated. Any application of these programs without additional verification is at the risk of the user.

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I. INTRODUCTION

Maintaining a military force that can be rapidly mobilized and deployed, is the primary management problem facing the Department of Defense [Ref. 1]. In the event of mobilization, additional manpower will be required to increase military forces from peacetime manning levels to full wartime strength, as well as to furnish prompt replacements for casualties. Because it is essential that individuals comprising these augmentation forces be trained in advance to fill time-critical military needs [Ref. 2: p. 37], the reserve component is accorded a major contingency role in mobilization planning. This "total force" concept envisions that reserve forces (as opposed to draftees or volunteers into the active duty forces) will be relied upon to be the principal means of supplementing active forces during a military emergency [Ref. 3].

Reserve forces are organized into three categories: the Ready Reserve, the Standby Reserve, and the Retired Reserve. (See Table I .) The Ready Reserve is the major source of manpower augmentation for the active force, consisting of the Selected Reserve and the Individual Ready Reserve (IRR). [Ref. 4]

TABLE I
THE RESERVE FORCE STRUCTURE

The Ready Reserve
- Selected Reserve
- Individual Ready Reserve

The Standby Reserve

The Retired Reserve

The Selected Reserve includes units organized, equipped, and trained to perform wartime missions; trained personnel designated to provide wartime augmentation to active units, known as Individual Mobilization Augmentees (IMA's); and members of the Selected Reserve in training. Selected reservists assigned to units and IMA's train throughout the year and participate annually in active duty training. The IRR consists of personnel who have served recently in the active forces or Selected Reserve and have some period of obligated service remaining on their contracts. These individuals generally do not participate in organized training, but are subject to call to active duty during a national emergency.

The Selected Reserve, then, consists of Training Program Units (TPU's) that are organized for mobilization and deployment. The numbers and types of these units are based upon Department of the Army (DOA) planned mobilization requirements. The IRR, on the other hand, consists of individuals intended primarily to augment both active and reserve units. Because the Selected Reserve provides the mainstay of mobilization manpower augmentation, it was chosen as the organizational focus for this thesis.

The Selected Reserve units of the U.S. Army Reserves (USAR) are composed of individuals who legally commit to between one to six years of service and who thereafter attend periodic training drills for which they receive pay. Generally, a member trains two days per month (sixteen hours, normally on weekends) and serves a two week period of active duty during the summer months. This active duty training is usually conducted at the nearest training site that can support the USAR unit's administrative, logistical, and training needs [Ref. 5: p. 12]. Additionally, at least twelve weeks of fulltime Initial Active Duty for Training (IADT) is required at entry for non-prior service personnel, as well as for those who have prior service experience but

are seeking to change their military occupational specialty (MOS). Specialized, fulltime training (one to six months in length) may also be required for advancement.

Each TPU is expected to achieve a minimum attendance of eighty-five percent of assigned strength for each monthly training period [Ref. 5: p. 10]. Satisfactory participation for reservists is defined as being present for all scheduled drills for which exemption has not been authorized by the unit commander. If an enlisted member accumulates nine or more unexcused absences within a one-year period, that reservist can, at the discretion of the unit commander, be declared an unsatisfactory participant and transferred to the IRR. (Prior to 1982, reservists charged with unsatisfactory participation had recourse to an administrative board hearing for disposition of the charge.) [Ref. 6]

Failure to join a TPU within ninety days of relocation is also considered non-participation and will result in transfer to the IRR. Other grounds for transfer to the IRR or for separation from military service include:

(1) Convenience of the government,
(2) Unsatisfactory performance,
(3) Misconduct,
(4) Alcohol or other drug abuse rehabilitation failure,
(5) Defective enlistments and reenlistments, and
(6) Homosexuality.

[Ref. 7]

Following significant declines in the number of reserve enlisted personnel from 1973 to 1978, the numerical strength of the reserve forces has recovered to a level comparable to that achieved during the draft era. (See Table II .) Several changes in Selected Reserve force structure have, however, occurred during the ten years following transition to the All-Volunteer Force. As Table III indicates, the mix of military personnel serving in the Selected Reserve has changed: educational attainment and aptitude scores of

participants have generally decreased, and participation by blacks and women has increased [Ref. 8: p. 5].

TABLE II

SELECTED RESERVE END STRENGTH
(IN THOUSANDS)

Period	Years	DOD	Army Components
Pre-Vietnam	1960-1964	948 (avg)	NA
Vietnam	1965-1969	953 (avg)	NA
Declining Draft Calls	1970	987	670
	1971	978	665
	1972	924	623
AVF Years With Low Retention	1973	919	621
	1974	925	638
	1975	897	620
	1976	823	557
	1977	808	544
	1978	788	527
AVF Years With High Retention	1979	807	536
	1980	850	573
	1981	898	614
	1982	963	665
	1983*	982	670

* Strength caps imposed.

SOURCE: Brinkerhoff and Grissmer, The Reserve Forces in an All Volunteer Environment, p. 3.

Another change in force structure has been an increase in the proportion of "career" force personnel, reflecting increased retention under the All-Volunteer Force. Table IV illustrates this change in the experience distribution with the Selected Reserve. (Percentages in Table IV do not sum to 100. due to rounding.) The shift toward a more experienced reserve force has several implications beyond the obvious fact that the force will be older. It would be reasonable to expect, for example, that an increased proportion of reserve personnel will be married and have dependents, suggesting correspondingly greater demand for housing, medical, and other family services. Re-evaluation of rotation policies may also be indicated, since it is likely that more members

TABLE III

CHARACTERISTICS OF U.S. SELECTED RESERVE ENLISTED PERSONNEL

	FY76	FY83
Personnel (N)	716,610	861,507
Percentage of force:		
Female	4.7	9.7
Black	11.3	18.5
AFQT		
Category I	11.2	7.0
Category II	36.4	32.4
Category III	44.6	52.0
Category IV--V	7.8	8.6
Education		
Non-high school graduate	14.7	23.2
High school graduate	54.6	61.9
Two years college +	30.6	14.9
Age		
17--20	9.2	15.9
21--25	34.4	25.2
26--30	28.9	16.4
31--40	17.1	28.3
41 +	10.4	14.2

SOURCE: Doering and Grissmer, Active and Reserve Force Attrition and Retention: A Selected Review of Research and Methods, p. 5.

will have working spouses who are disinclined to relocate. Finally, the quality of first-term personnel may, in the long run, be affected: as retention increases, accession requirements are decreased, enabling recruits to be chosen more selectively. [Ref. 8: pp. 6-8]

The experience distribution of the reserve force derives, in part, from the relative proportion of non-prior and prior service accessions to the Selected Reserve. The evolution of changes in the mix of non-prior and prior service accessions has been discussed by Brinkerhoff and Grissmer [Ref. 2: pp. 2-23]. During the Vietnam war, many individuals with no previous military experience sought to join the Reserve as a means of delaying or "staving off" active duty service. Typically, reserve force enlistees were

TABLE IV

EXPERIENCE DISTRIBUTION OF SELECTED RESERVE FORCE ENLISTED PERSONNEL (IN PERCENTAGES)

Years of Service	FY76	FY82	FY90*
1--5	52	46	36
6--10	32	25	25
11 +	12	29	40

* Projections

SOURCE: Doering and Grissmer, Active and Reserve Force Attrition and Retention: A Selected Review of Research and Methods, p. 7.

individuals with both high aptitude test scores (as measured by the Armed Forces Qualification Test) and high educational attainment. When the war and the draft ended, however, this pool of potential recruits disappeared and reserve accessions fell. To counter the decline in accessions of non-prior service recruits, the Reserve intensified its recruiting of prior service personnel, as shown in Table V . Concommitant reductions in active duty end strength levels, coupled with enhanced retention of active duty personnel under the All-Volunteer Force, resulted in fewer separations from the active force. (See Table VI .) This supply of prior service personnel available to fill Reserve accession requirements was therefore reduced.

In the late 1970's, recruitment of non-prior service individuals began to recover from the mid-decade decline, for several reasons. In the first instance, enlistment bonuses and education tuition grants were offered to reservists. Additionally, recruiting and advertising resources were increased, and the reservists themselves were charged with recruiting others into the Selected Reserve organization. This development of an effective recruiting organization, in conjunction with prevailing economic

TABLE V

ACCESSIONS TO THE U.S. ARMY SELECTED RESERVE
(IN THOUSANDS)

Fiscal Year	NPS	PS	Total	% PS
70	149	28	176	15.9
71	83	21	104	20.2
72	62	54	117	46.2
73	37	68	105	64.8
74	36	115	152	75.7
75	52	98	149	65.8
76	57	100	157	63.7
77	56	101	157	64.3
78	53	88	142	62.0
79	64	75	139	54.0
80	76	80	157	51.0
81	84	80	164	48.8
82	86	84	171	49.1

SOURCE: Brinkerhoff and Grissmer, The Reserve Forces in an All-Volunteer Environment, p. 7.

TABLE VI

ACTIVE DUTY ENLISTED SEPARATIONS
(IN THOUSANDS)

Fiscal Year	Army	DOD
71	492	890
72	469	800
73	226	546
74	204	497
75	209	484
76	193	466
77	175	415
78	146	348
79	156	378
80	154	373
81	132	344

SOURCE: Brinkerhoff and Grissmer, The Reserve Forces in an All-Volunteer Environment, p. 30.

conditions (high unemployment) and improvements in public opinion of the military, eventually raised the level of non-prior service accessions. Retention in the Selected Reserve improved, as well. In fiscal year 1979, the year in which the first cohort of six-year, voluntary obligors were

eligible for reenlistment, high retention rates predicted for the All-Volunteer Force were realized: in 1978, reenlistment bonuses had been offered to reservists, raising long term retention by an estimated twenty-five percent [Ref. 2: p. 30].

While it is difficult to assess the extent to which the increases in reserve accessions and improved levels of retention have resulted from organizational policy changes (as opposed to external factors, such as economic conditions in the civilian sector), it is clear that attrition from the Reserve represents significant costs associated with procurement and training of replacement personnel. Additionally, implicit organizational costs of attrition likely include adverse effects on the remaining reservists: decreased cohesion and commitment, and disruption of social and communication patterns [Ref. 9].

The purpose of this thesis is to investigate early attrition from the U.S. Army Selected Reserve enlisted forces. Chapter II presents pertinent economic theories of labor force participation and turnover, and concludes with a review of literature relevant to attrition behavior within both active duty and reserve components of the military forces. Following a description of the data base, Chapter III introduces parameters of the dependent variable used to define attrition, as well as the candidate independent variables and their associated measures. The chapter also discusses various methods and procedures employed to perform preliminary statistical analyses, including an examination of apparent differences between non-prior and prior service populations and among stayer/leaver subgroups within each population.

Multivariate regression models were constructed to investigate the relative importance of and interrelationships among potential determinants of attrition behavior. The results of these models are given in Chapter

IV, along with associated statistical evaluations. Finally, recommendations for construction of data files to support future research, as well as recommendations for the direction of future research, are discussed in Chapter V.

Predictive models of attrition which incorporate biodemographic data available at the time of enlistment can facilitate more efficient reserve force management policies. For example, these models can be utilized to develop applicant screening devices designed to predict the probability of attrition from known personal attributes and the occupational characteristics of reserve unit availabilities.

Recruitment policies that minimize enlistment of "high attrition risk" individuals prior to costly investment in initial training and assignment, will accordingly contribute to efficient allocation of resources within the reserve structure. Given that the Selected Reserve provides the primary means of force augmentation and support in the event of mobilization, it follows that prudent management of reserve force recruitment programs will ultimately enhance the wartime capability of the entire military structure.

II. THEORETICAL FRAMEWORK

A. LABOR MARKET THEORY

1. Participation in the Selected Reserve

The Selected Reserve, like the active duty component of the military force structure, must procure and retain personnel directly. That is, individuals (both non-prior service recruits and prior service recruits) must apply and be accepted for enlistment. In this regard, the reserve organization is analogous to a civilian employer--it must attract and retain the appropriate quantity and quality of personnel to fulfill its mission. The basic conceptual framework for analysis of reserve force participation, then, is provided by traditional economic theory. Specifically, theories of moonlighting, job search, and turnover are pertinent and will be discussed in this section.

Reservists work either eight or sixteen hours per month. Because hours of work are so restricted, reserve participation can be viewed as a part-time job which attracts "moonlighters", who are individuals holding full-time (civilian) jobs. That is, individuals working a given number of hours on a primary job may want to increase their income by working additional hours, if the hours available on the primary job are less than that preferred by the individual. In order to do so, they must acquire a second job. Reserve participation offers the moonlighter this opportunity to earn more money, as well as non-monetary benefits such as the esprit de corps of military service and fringe benefits such as retirement pensions. Both monetary and non-pecuniary factors, then, may influence the individual to enlist in the Reserve.

The decision to participate in the Reserve has therefore been described as a special case of the decision to moonlight [Ref. 10: p. 5]. Moonlighting theory suggests

that the hours of work supplied to the labor market by an individual will be a function of labor market income and the individual's valuation of time spent on all non-market activities (hereafter called leisure time). According to this theory, workers will supply to the labor market the number of hours for which earnings are sufficient to compensate the foregone leisure time. For this desired number of labor hours, the wage rate equals the individual's marginal value of leisure time. Both wages and hours worked, therefore, affect the moonlighting decision, in that the probability that an individual will decide to moonlight is increased by: lower primary wages, fewer hours worked on the primary job, higher secondary wages, and more hours offered by the secondary job.

The reserve job, however, differs from other moonlighting or part-time jobs. The most important difference is that reservists must legally commit to a one- to six-year service obligation. But a number of additional features also distinguish reserve participation from civilian part-time employment: costs of travelling to the reserve unit, potential conflicts with civilian job commitments owing to (full-time) annual training requirements, and the limitation on available working hours offered by the Reserve [Ref. 10: pp. 3-4]. Unique social factors may also play a significant role in reserve participation. Grissmer and Kirby, in an analysis of reenlistment in the reserve force, found that reservists, unlike civilian moonlighters, appear to be motivated more by a preference or taste for the job itself than by monetary incentives--the major reasons for separation seem to be conflicts with the individual's family or civilian job, rather than any aspect of the reserve job per se [Ref. 10: p. 22].

A theory of moonlighting premised upon the tradeoff between leisure and additional income was published by Shishko and Rostker in 1976 [Ref. 11]. This model was

subsequently modified by McNaught to incorporate features of the employment context unique to the Reserve. [Ref. 12: p. 9]. Figure 2.1 illustrates the hypothetical relationship of hours worked on the primary and secondary jobs, to wages earned. The horizontal axis represents time, which may be spent in either work or leisure activities; while the vertical axis shows market income. Indifference curves (labeled U, U', and U" in Figure 2.1) show all combinations of time use and income that produce a constant payoff or level of utility for the worker. (The indifference curves higher or more "northerly" in the quadrant represent higher levels of utility.) The slope of the line labeled W_0 in Figure 2.1 reflects the primary job wage rate (i.e., the amount earned per unit of time). Moving left on the horizontal axis, then, shows increasing amounts of hours worked and hence increasing income. The point L_0 on the horizontal axis is interpreted as the maximum number of working hours that can be supplied to the primary job. The individual's marginal value of leisure time, on the other hand, is shown as W_0, the slope of the lowest indifference curve (U).

In this illustration, the individual values leisure at a rate (per unit time) less than the market wage rate (W_0) for L_0 hours of labor. The worker will therefore wish to supply more hours to the labor market up to L* hours, where the worker's marginal value of leisure time equals the market wage rate. This point of equilibrium is labeled P on indifference curve U' and represents a correspondingly higher level of utility as well as income. If a secondary job with a wage rate equal to W_0 can be obtained, the worker will supply L* hours to the labor market.

As previously mentioned, the fundamental difference between civilian moonlighting and joining the Reserve, is that reserve drill schedules are inflexible--only a limited

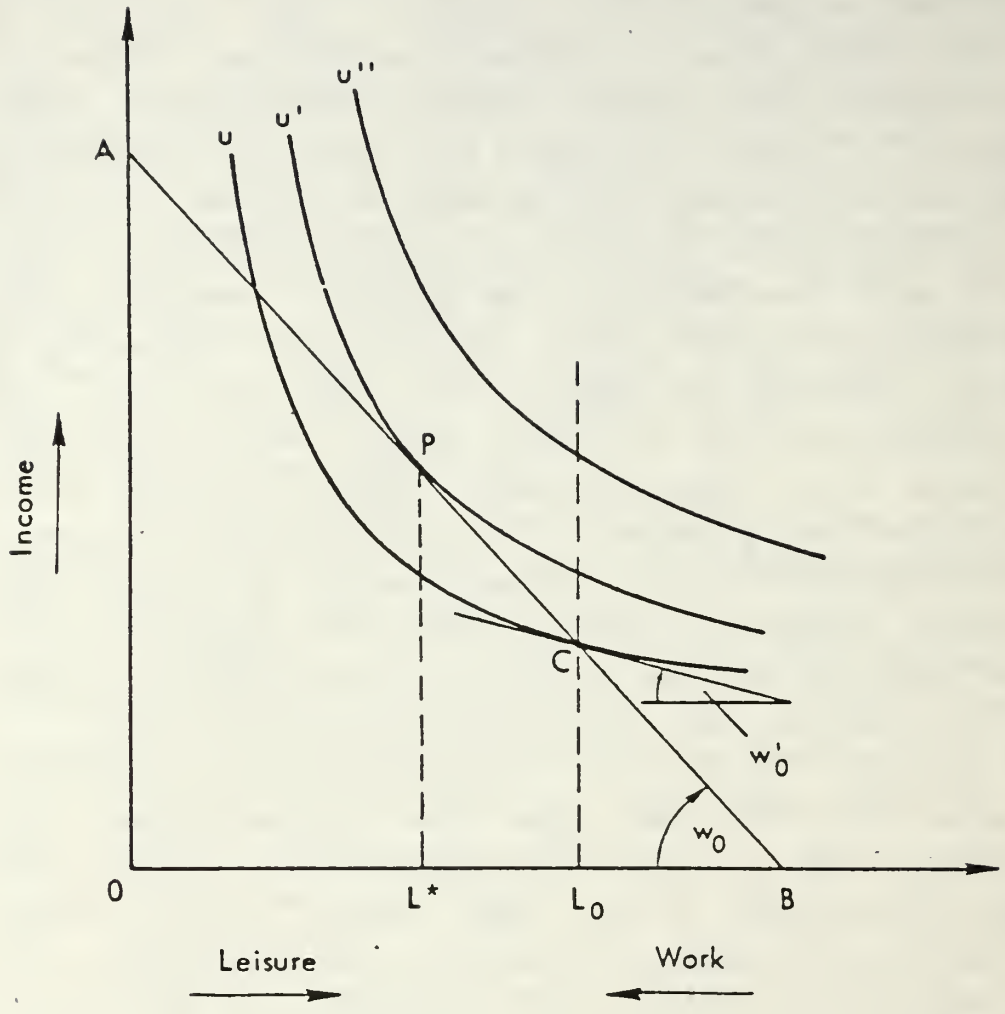

Figure 2.1 Effect of Restricting Hours Worked on the Primary Job.

number of paid drilling hours are offered to the reservist. Figure 2.2 shows the effect of the rigid schedule of available hours in the secondary job. (Note that Figure 2.2 assumes, for the sake of simplicity, that the primary and secondary wage rates are equal.) If the sum of hours worked on the primary and secondary jobs is fixed at a level more than the number of hours the worker desires to supply (L'), the worker will likely forego secondary work. Conversely, if total hours of work are fixed at a level less than that desired (R), some utility will be gained through secondary employment, but not to the degree possible had the hours of work been unconstrained [Ref. 12: p. 16].

Another complication considered by McNaught in conjunction with the issue of fixed drill hours, was that of travel costs. Costs incurred by the reservist in traveling to the drilling unit are not reimbursable [Ref. 5: p. 10]. Given the decrement in utility resulting from the limitation of working hours (see Figure 2.2) the further reduction in utility arising from even relatively low travel costs could tip the scales in favor of nonparticipation. Ultimately, McNaught's final model, although not empirically tested, was conceptualized in the following functional form:

$$R = f(W, C, S, H, U, P, I, T, X)$$

where R is reserve participation,
W is the reserve wage,
C is the civilian primary wage,
S is the civilian secondary wage,
H is the hours worked on the primary job,
U is the unemployment rate,
P is the population of eligible enlistees,
I is available information about reserve enlistment opportunities,
T is travel costs, and
X is a set of regional variables.

[Ref. 12: p. 20]

Other studies undertaken to investigate moonlighting behavior have confirmed the significance of factors affecting earnings and therefore the relative valuation of leisure time. Studies have shown, for example, that relative to workers with only one job, moonlighters generally:

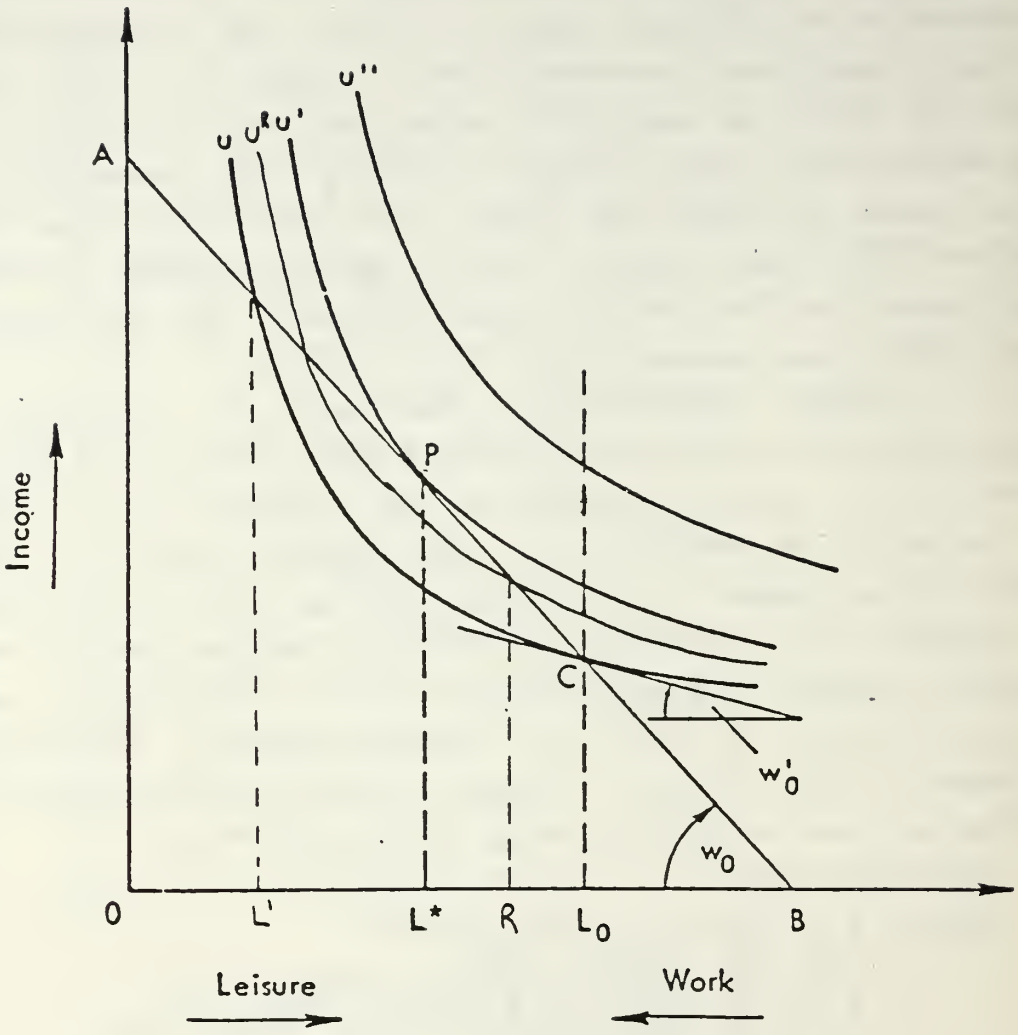

Figure 2.2 Effect of Restricting Hours Worked on the Secondary Job.

employment. Kahn and Low maintain that the choice of search method depends upon a comparison between the expected benefits of searching while unemployed (versus while employed) and the income foregone while unemployed. The greater the difference between the expected wages and current wages, the greater the probability that the search will be performed while unemployed. In their attempt to estimate the determinants of the choice of search mode, Kahn and Low found that, after controlling for selectivity bias, searching while unemployed resulted in wage offers that were approximately ten percent greater than that obtained through an employed search. [Ref. 14]

Barron and McCafferty concluded that the incidence of quitting the current employment in order to seek alternative employment is ultimately tied to the market vacancy rate. They found the elasticity of the quit rate (individuals quitting current employment to seek alternative employment) with respect to the market vacancy rate to be .49, indicating that a decrease in the vacancy rate is associated with increases in the number of "quits" entering unemployment by that proportion. [Ref. 15]

2. The Attrition Process

Attrition from military service can be generically categorized as a type of labor market mobility known as turnover. In the most general sense, "turnover" can be defined as, "the degree of individual movement across the membership boundary of a social system" [Ref. 16: p. 4]. Relative to the employment context, such movement may be either involuntary or voluntary [Ref. 13: p. 171]. Involuntary turnover represents dismissals by the employer or other circumstances necessitating changes in employment status that are not directly related to the preferences of the employee. Voluntary turnover, on the other hand, is the outcome of the employee's decision to quit current employment. This decision-making process may involve both

(1) tend to be younger,
(2) have more education,
(3) have larger families,
(4) incur greater household expenses,
(5) receive only nominal non-labor incomes,
(6) earn smaller primary incomes, and
(7) work fewer hours on their primary jobs.

[Ref. 12: p. 10, citing Gutherie, 1969, Hamel, 1969, and Percella, 1970]

The findings above illustrate that the search for employment is often conducted by employed workers who, finding income insufficient to meet expenses, are dissatisfied with the hours on their current job. Individuals who cannot work as many hours per week as they would like on their present job, are almost twice as likely to engage in job search while employed [Ref. 13: p. 150]. It follows from the McNaught model (see Figure 2.1) that a primary cost involved in job search while employed, is loss of leisure time. This loss, combined with the risk of losing the current job prior to an alternative being found, tends to decrease the number of contacts with potential employers that can be made. McNaught's final model accordingly recognizes the significance of available information about reserve enlistment opportunities as a determinant of reserve participation. Individuals who are unemployed during their job search efforts face a different dilemma: if an unemployed individual accepts the first job offer received, that individual may not obtain the optimal job. However, the longer the search for employment is prolonged, the greater will be the costs in terms of both time invested and income foregone. [Ref. 13: p. 146]

There has been some debate in the literature as to whether it is more efficient to search for employment while employed, or to quit the unsatisfactory job so that more time can be devoted to the search for alternative

occupational and non-occupational antecedents to the actual turnover behavior. One model depicting this decision-making process was developed by Mobley in 1977 [Ref. 17]. As shown in Figure 2.3, this model characterized nine factors as relevant to the turnover decision: job evaluation, job satisfaction/dissatisfaction, thinking of quitting, expected utility of the search and cost of quitting, intention to search, search for alternatives, evaluation of alternatives, comparison of alternatives versus present job, and intention to quit/stay.

Although this model was later expanded to accommodate age of the employee and tenure [Ref. 18], Mobley, Griffeth, Hand, and Meglino, in 1979, noted that the factors found in previous research to be negatively related to turnover behavior (age, tenure, overall job satisfaction, job content, intention to remain on the job, and job commitment) generally explained less than twenty percent of the observed variation in turnover [Ref. 19]. Mobley, et al. therefore elaborated on the previous studies by developing a conceptual model of turnover that: 1) differentiated between present satisfaction and future utility for current and alternative jobs, and 2) encompassed the non-work values and considerations involved in the turnover decision.

As shown in Figure 2.4, the focus of the expanded Mobley model was intention to quit, as the immediate precursor of turnover behavior. Three primary determinants of intention to quit were hypothesized:

(1) Satisfaction, or the response to evaluation of the present job;

(2) Attraction, or the expectancy that in the future the present job will lead to outcomes of differing values, and the expected utility of the present job; and

(3) Attraction or expected utility of alternatives.

It was, however, recognized by Mobley, et al. that the relationship between intentions and turnover behavior could be weakened by impulsive behavior and by the

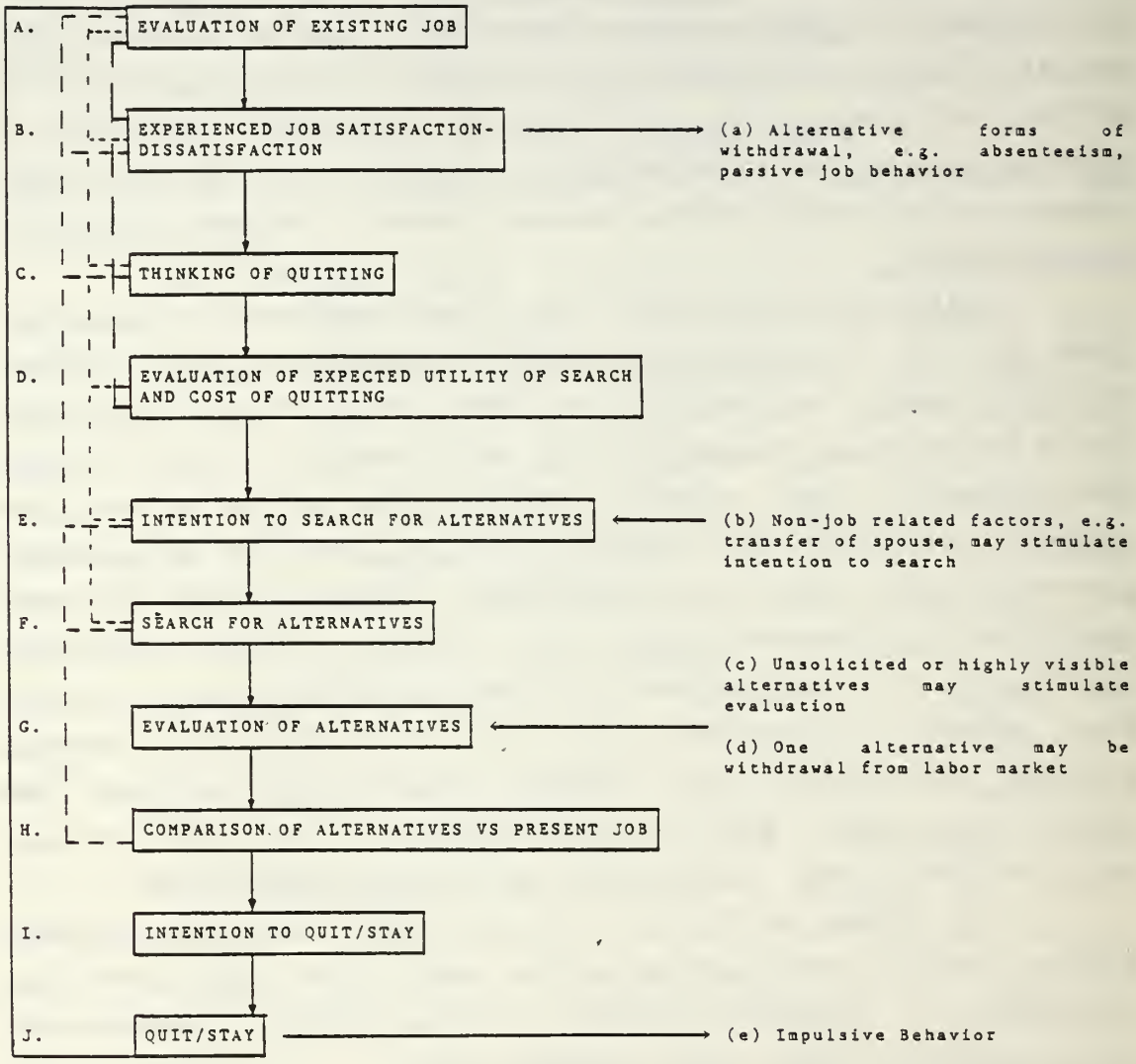

Figure 2.3 Mobley (1977) Model of the Employee Turnover Decision Process.

intervening time between the measurement of intention and the turnover behavior itself (as well as other moderating influences, such as non-work values and the consequences of turnover). Later work by Michaels and Spector modified the Mobley, et al. model to include preemployment expectations and degree of organizational commitment [Ref. 20]. The results of this study were consistent with the model, although perceived alternative employment opportunities did not add to the explanatory power of the model.

Application of the Mobley, et al. model to the military employment context was demonstrated by Youngblood, Mobley, and Meglino in a study of the turnover behavior of a cohort of U.S. Marine Corps enlistees [Ref. 21]. Findings of this study revealed that the determinants of intention (as postulated by Mobley, et al.) did, in fact, vary significantly between those enlistees who attrited and those who remained in the U.S. Marine Corps. A concurrent study of turnover from the U.S. Military Academy at West Point and the Officer Candidate School at Fort Benning by Butler, Lardent and Miner [Ref. 22], recommended that pertinent motives and "fit" within the organization should also be included in the model of turnover.

The work by Butler, Lardent and Miner (1983) presaged recognition in the literature of the relationship between job performance and turnover, which was subsequently incorporated into the model by Jackofsky (1984) [Ref. 23]. The premise of the Jackofsky model, illustrated in Figure 2.5, is that job performance is tied to all forms of turnover, both voluntary and involuntary. That is, job performance is linked to voluntary turnover resulting from ease and desirability of movement, turnover that is recorded as voluntary when in fact it is induced by the anticipation of employer action, and to involuntary turnover through termination or demotion. The following functional

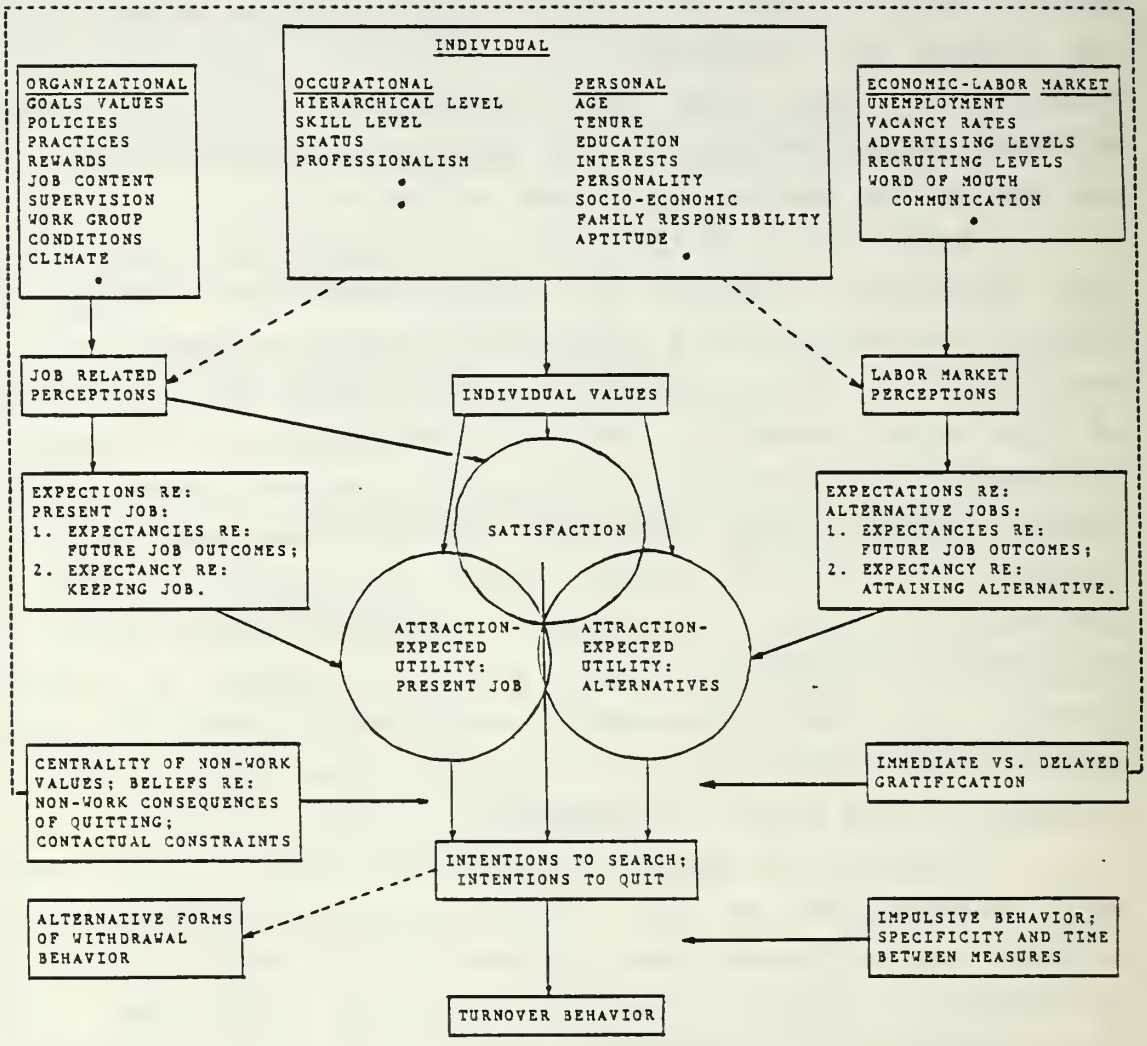

Figure 2.4 Mobley, et al. (1979)
Model of the Turnover Process.

relationships between job performance and turnover were set forth by Jackofsky:

(1) The lower the level of job performance, the greater the probability of turnover (i.e., turnover resulting from either administrative action or the threat thereof);

(2) Low but satisfactory performers who are not separated by the employer are more likely to remain in current job, since movement to other jobs is relatively more difficult for marginal performer; and

(3) A greater probability of turnover is associated with high performers, owing to greater ease of movement within the labor market.

A theoretical approach that is useful in summarizing these models, is consideration of turnover in terms of individual and employer uncertainty. In the first instance, voluntary turnover (particularly that turnover which occurs relatively early in the course of employment) can be viewed as a mechanism by which workers acquire information about the labor market [Ref. 13: p. 171]. In other words, there may be various unobservable characteristics of the job that can be learned only through experience on the job. Hence, the job must actually be "tried out" before the worker can ultimately match skills and preferences to type of occupation and/or specific employer [Ref. 10: p.25, citing Pencavel, 1972]. Similarly, involuntary turnover, or separations initiated by the employer, may reflect the employer's opportunity to observe performance attributes of the worker that were not observable during the employment screening and selection processes.

In regard to reserve participation, a common precedent of losses which occur during training, for example, is deficient performance of the trainee. In the case of a non-prior service recruit, the attrition process which occurs during initial training may represent involuntary turnover--the military organization, in response to indices of poor performance, separates the trainee as a result of the improved information about that trainee's performance obtained during the early employment period. In contrast,

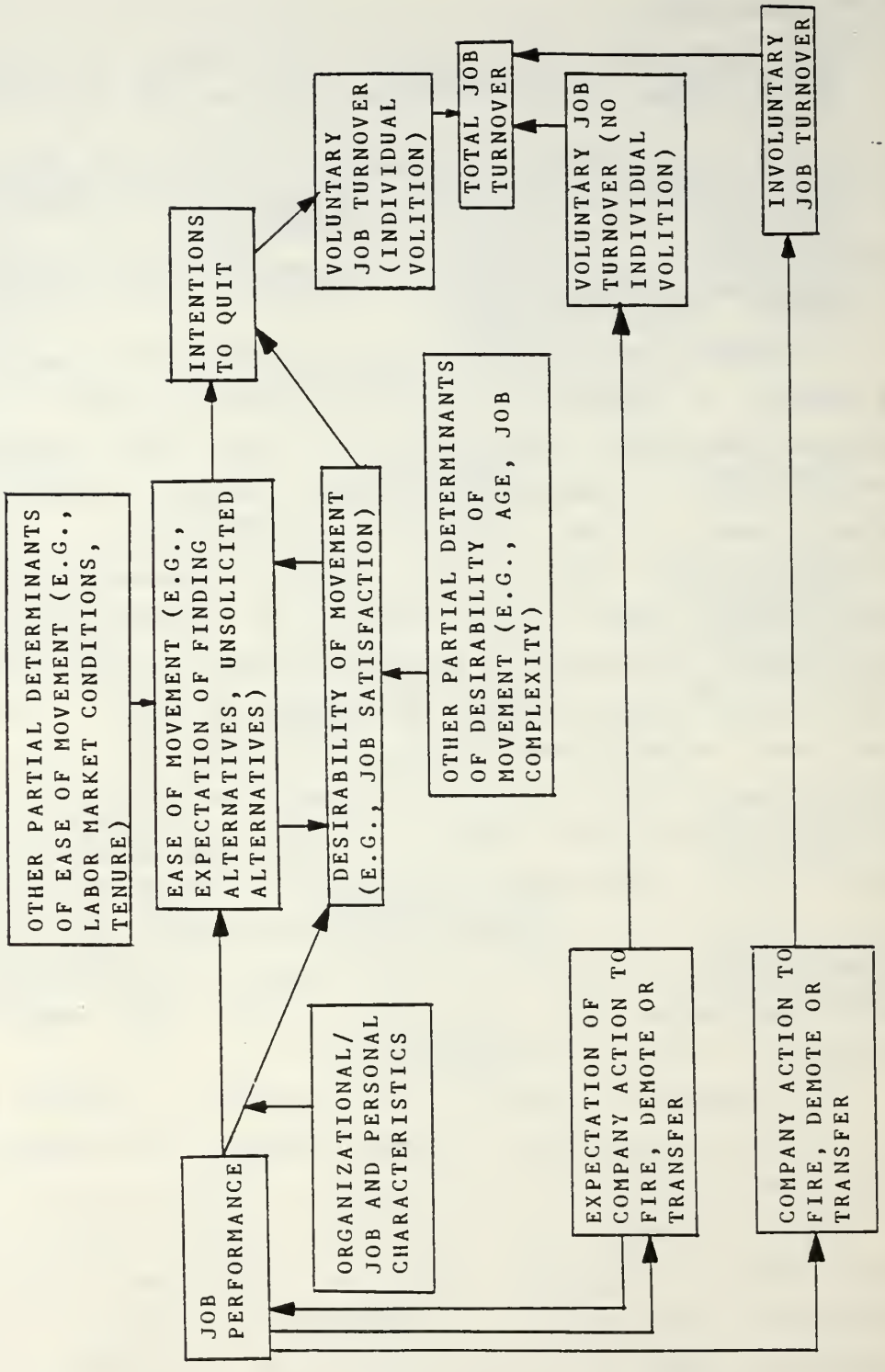
OTHER PARTIAL DETERMINANTS OF EASE OF MOVEMENT (E.G., LABOR MARKET CONDITIONS, TENURE)
EASE OF MOVEMENT (E.G., EXPECTATION OF FINDING ALTERNATIVES, UNSOLICITED ALTERNATIVES)
DESIRABILITY OF MOVEMENT (E.G., JOB SATISFACTION)
OTHER PARTIAL DETERMINANTS OF DESIRABILITY OF MOVEMENT (E.G., AGE, JOB COMPLEXITY)
INTENTIONS TO QUIT
VOLUNTARY JOB TURNOVER (INDIVIDUAL VOLITION)
TOTAL JOB TURNOVER
VOLUNTARY JOB TURNOVER (NO INDIVIDUAL VOLITION)
INVOLUNTARY JOB TURNOVER
JOB PERFORMANCE
ORGANIZATIONAL/ JOB AND PERSONAL CHARACTERISTICS
EXPECTATION OF COMPANY ACTION TO FIRE, DEMOTE OR TRANSFER
COMPANY ACTION TO FIRE, DEMOTE OR TRANSFER

Figure 2.5 Jackofsky (1984) Model of Turnover.

post-training attrition of both non-prior and prior service recruits can generally be viewed as the decision-making process on the part of the reservist, in which case the attrition represents voluntary turnover [Ref. 24: p. 205]. Here, experience attributes of the reserve job which have become known to the reservist during employment, can serve as the impetus for attrition behavior in a number of ways: the experience attributes (e.g., regimentation) may be considered unacceptable or undesirable by the reservist; the experience attributes may interact with those of the primary job (as, for example, in the case of scheduling conflicts); or the experience attributes may actually reinforce a taste for military service, resulting in enlistment into the active duty forces.

As stated by Grissmer and Kirby:

> The attrition process can then be viewed as the consequence of rational decisionmaking in which belated information regarding the various experience attributes of the moonlighting job and the performance attributes of the employee is received and evaluated by both the worker and employer. Critical levels exist for both the employee and the employer. Separation will occur if either employee performance on the moonlighting job does not exceed the critical performance level for the employer, or "moonlighting job experience attributes" do not exceed some threshold set by the employee. [Ref. 10: pp. 25-26]

The economic theories presented in this section are useful in conceptualizing the nature of reserve participation and accordingly provide the underpinnings for the analytical portions of this thesis. The following section will review the findings of research previously undertaken to empirically investigate the nature and causes of attrition from military service.

B. REVIEW OF LITERATURE

The purpose of this review is to present variables which have been found to be important in military attrition research. For the purposes of this thesis, attrition pertaining to the enlisted military Reserve is defined as "departure of the member prior to the expiration of the obligated term of enlistment." Understanding of factors associated with attrition from military service is instructive in the development of subsequent research methodologies, as well as in the eventual application of the findings to the management of military forces.

Doering and Grissmer, in a recently published review of military attrition literature, describe the major findings of the research in this area [Ref. 8]. As pointed out in their review, the majority of literature on military attrition has examined attrition from active duty forces as opposed to reserve forces, primarily because of the greater availability of data on active duty members. Several studies reviewed by Doering and Grissmer have utilized both survival function and regression techniques to analyze attrition from the active duty forces. (The latter technique is more fully discussed in Chapter IV.) Of the variables found to be useful in predicting attrition, the most significant was usually educational attainment: individuals with a high school diploma have roughly half the rate of attrition of non-high school graduates. Degree attainment is commonly seen as being a measure of such intangible attributes as conformity and adaptability [Ref. 8: p. 13]. Research findings on other personal characteristics found to be associated with attrition from active duty forces included the following:

(1) Members with higher Armed Forces Qualification Test (AFQT) scores have lower rates of attrition;

(2) Women have higher attrition rates than men;

(3) Older accessions (over 20 years) and younger accessions (under 18 years) have higher attrition rates;

(4) Married recruits have lower attrition rates than single recruits; and

(5) Higher attrition levels correspond to longer terms of service.

[Ref. 8: p. 13, citing Goodstadt and Glichman, November 1975]. See also, [Refs. 25,26,27,28].

More current work has looked at survey data on, for example, cognitive and affective traits of service members, in conjunction with biodemographic variables [Ref. 26]. Other recent studies have analyzed several cohorts concurrently in an attempt to account for cohort size, as well as external factors such as economic cycles [Ref. 8]. Ultimately, the assumption underlying much of this research is that if the selection process were to be altered to screen out "high risk" individuals, attrition would decrease.

Between fical year 1979 and fical year 1982, however, the quality of recruits increased substantially without a corresponding decrease in attrition, implying that economic conditions and/or institutional policies (such as separation policies, retention incentives, etc.) also influence attrition rates [Ref. 8: p. 14]. This possibility is particularly significant in analyzing reserve force attrition, given that the employment contexts of active duty and reserve force participation are fundamentally different. Unlike the active duty force, the Reserve employs people on a part time basis. Surveys indicate that 93 percent of reserve personnel also have full time civilian jobs [Ref. 8: citing Burright, Grissmer and Doering, 1982]. Attrition might therefore be affected by the reservist's being a multiple job holder. Another significant difference in the nature of the employment is that reservists do not have to relocate upon joining the Reserve; and finally, reservists' households have access to fewer military benefits, such as full time commissary and exchange privileges, that do active duty members' families.

Grissmer and Kirby recently analyzed the attrition behavior of non-prior service, enlisted personnel in the Army Reserve and Army National Guard [Ref. 10]. They point out that reserve participation resembles civilian moonlighting in some respects, but that there are also some major differences:

(1) Reservists are legally committed to their term of service;

(2) All reservists must leave their primary job for at least two weeks annually to work full time on the reserve job, and new non-prior service reservists must additionally train full time for at least four months;

(3) Reservists drill a limited, specified number of hours and therefore do not have the option of working more in order to earn more;

(4) The reserve job offers nonpecuniary benefits such as specialized training, as well as an environment of esprit de corps and teamwork; and finally,

(5) Reservists receive other fringe benefits of military service, such as educational benefits and exchange privileges (while on annual training).

As discussed in the Doering and Grissmer review, research on attrition from the Reserve has related the incidence of attrition to both biodemographic factors and occupational factors [Ref. 8: pp. 18-20]. By analyzing data on non-prior service reservists who entered military service in fiscal year 1980, the Grissmer and Kirby study found that of the 39.6 percent attrition loss from the 1980 Army Reserve cohort during the first two years of service, lower attrition rates were associated with: 1) males, 2) members with more education, 3) members with higher AFQT scores, and 4) younger members [Ref. 10: pp. 29-37].

In another recent study it was determined that the typical non-prior service recruit is 19--20 years old at the time of accession and 25--26 years old at the end of the first enlistment. (The majority of non-prior service recruits are six year obligors.) Census data further indicated that roughly one in two people will marry in the 19--25 year old range. Since one of the leading reasons given by reservists for not reenlisting is conflicts with

spouse, there is some indication that attrition rates for this age group might also be associated with changes in family status. [Ref. 8: citing Burright, Grissmer and Doering, 1982]

Similarly, migration data indicated that about four in ten 23 year olds move annually and that approximately 34 percent of people in the 18--24 year old group change their full time jobs each year. The implications for reserve force participation are twofold: 1) the civilian employer in the new location may have a negative attitude towards reserve participation, and 2) the reserve unit in the new location may not have the same mission or utilize the same skills as the unit of origin [Ref. 8: citing Haver, Laman, and Green, 1983]. The relevance of both family status and labor market mobility in explaining reserve attrition has been further supported in recent work by Grissmer and Kirby (forthcoming).

Manganaris and Schmitz examined active duty attrition rates as a function of job assignment characteristics, along with those characteristics of the individual that were known at the time of job assignment (i.e., demographic characteristics) [Ref. 29]. The objectives of their research were to accurately predict the percentage of attrition during the first tour, account for the variability in attrition within Military Occupational Specialty (MOS), and isolate tradeoffs that can impact assignment policy.

This study used the MOS as a proxy for organizational factors. That is, MOS was believed to capture aspects of individual lifestyle, living conditions, variety of work, and occupational experiences. AFQT group, sex and education were also included as individual characteristics. A longitudinal data base consisting of non-prior service accessions who joined the Army between January, 1976, and September, 1978, was used to estimate two multiple regression equations. The first model was MOS-specific and examined

variation in the rate of attrition as a function of MOS, AFQT and educational attainment. This equation was fitted to males only. The second model was more generic in that it was not MOS-specific--separate equations were estimated for males and females.

Manganaris and Schmitz found that the MOS-specific model explained roughly 86 percent of the variation in attrition. When an (MOS x education) interaction term was added, however, the amount of variation accounted for by the model increased to 89 percent (with a 4 percent decrease in the standard error of the estimate). The more general model, on the other hand, explained only about 74 percent of the variation in attrition for males, and exhibited a higher standard error. This equation accounted for only about 32 percent of the variation in attrition for females. As Doering and Grissmer point out, these results were not surprising since education had not been included as a variable for females. (There were almost no female non-high school graduates in the sample.)

Survival curve methodologies have also been fruitful in analyzing attrition. This technique is used to estimate the functional relationship between explanatory variables and the empirical distribution of cohort "survivors" to discrete length of service intervals. Lurie, for example, developed survival curves for non-prior service active duty males in the Navy using fiscal year 1979 cross-sectional data [Ref. 30]. Using the survival curve technique, educational attainment had the greatest effect on survival findings. Enlistees with a high school degree survived significantly longer than those with a General Educational Development (GED) certificate or those with no degree. For the first four years of service, the survival behavior of the GED group was similar to that of the non-high school graduates. The distribution of projected survival expectancies for those GED group members who attended specialized

training in Navy "A" schools did, however, differ form that for similar non-high school graduates--the "A" school attendees survived longer that non-"A" school members [Ref. 30]. Other findings illuminated by the Lurie research were that: 1) after 21 to 22 years of age, survival decreased with age; and 2) while class "A" school attendance increased survival probabilities for all educational groups, it was particularly significant for non-high school graduates and GED group members. In contrast to other studies [Ref. 8], however, Lurie found that AFQT scores had little bearing on survival and showed no consistent pattern of effect.

Using models of firm-specific human capital and job matching as a theoretical framework, Buddin (1984) expanded the scope of attrition analysis by developing a multivariate model that used demographic background, prior experience, job match and satisfaction, entry point decisions, alternatives to the military, and socioeconomic factors. The data base consisted of a matched file which incorporated the 1979 Survey of Personnel Entering Active Duty and the personnel records (enlistment and loss files) for male active duty service members. [Ref. 26]

The study found that an individual's prior work history also has a significant impact upon early attrition. A period of unemployment in the year preceeding enlistment increased separation rates by 2.2 percent during the first six months of service. Also, accessions who had changed civilian jobs frequently were more likely to attrite. Indicators of military job match (not qualifying for the type of job preferred, possessing knowledge of job qualification prior to enlistment, or obtaining the desired job) had no significant bearing on early attrition; nor did measures of job suitability (satisfaction with military service or with the specific military job assignment). [Ref. 26]

The diversity of findings represented in the studies reviewed by Doering and Grissmer was succinctly categorized

as early as 1977. At that time, a conference sponsered by the Office of the Secretary of Defense (OSD) and the Office of Naval Research (ONR) assessed alternative ways of managing first term or "premature" attrition. Three major causes for premature attrition were identified at the conference: societal, individual and organizational causes. [Ref. 31]

Societal causes captured the consequences of changing cultural values on the military services. Conference members identified several potential methods for dealing with this problem, such as selecting accessions who seem best able to adapt to military life, enlisting more women, "civilianizing" military billets, and implementing organizational changes. Individual causes referred to unrealistic expectations concerning the nature of military service on the part of the recruit. Improved screening for motivation, adjustment and literacy was suggested as a possible solution to this cause of attrition. Additionally, realistic orientations for new accessions and rehabilitation for marginal performers were recommended to further reduce attrition. Finally, organizational causes addressed defective management policies and practices. Proposed solutions in the area involved direct intervention, such as different training schedules and assignment procedures for recruits with differing aptitude levels, and also organizational changes, such as the elimination of the up-or-out promotion policy. [Ref. 31]

Lockman points to several initiatives which have been undertaken since the OSD/ONR conference to reduce early attrition:

(1) The screening of potential accessions on the basis of education, AFQT scores, and age;

(2) Expansion of the use of the Delayed Entry Program (DEP) to provide a smoother transition into the military;

(3) Inclusion of remedial education during initial training;

(4) Use of behavioral skill training to improve the motivation of marginal performers and disciplinary problems;

(5) Implementation of Leadership and Management Effectiveness Training (LMET) to improve the human relations skills of supervisors; and

(6) Extended apprenticeship training for enlistees not qualified for technical training.

[Ref. 31: pp. 8-9]

In summary, it is apparent from both economic theory and prior research findings, that numerous personal, societal and organizational factors affect attrition; and that the analysis of attrition should be multivariate in nature. Further investigation of the possible determinants of attrition will ultimately facilitate the management of personnel policies in reducing the costs associated the the procurement and training of replacement personnel.

III. METHODOLOGY

A. RESEARCH OBJECTIVES

The primary research question addressed by this thesis was to ascertain whether personal and occupational factors could be identified which affect early attrition in the U.S. Army Selected Reserve. Ultimately, the research objective was to construct a causal model to predict attrition. Subsidiary research questions included:

(1) Prior service and non-prior service population characteristics;

(2) Differences in, and the importance of, stayer/leaver profile characteristics between the prior service and non-prior service groups;

(3) The significance of the timing of the loss in relationship to factors influencing attrition.

This chapter examines the primary analysis variables and profiles prior service and non-prior service groups within the U.S. Army Selected Reserve enlisted force sample. Non-prior service and prior service group differences in early attrition rates relative to timing and destination of losses are developed, and simple bivariate analyses of stayer/leaver groups with regard to candidate explanatory variables (individual characteristics and selected occupational factors) are presented.

B. DATA BASE

Information on reserve personnel is maintained by the Defense Manpower Data Center (DMDC). Selected data elements from the Reserve Components Common Personnel Data System (RCCPDS) data base are structured in cohort files for each year, fiscal year 1978 through fiscal year 1982. These cohort files contain the enlistment records, subsequent reserve (and active duty) master file records, and up to four loss records for individuals who were accessions to the Selected Reserve during each fiscal year.

Data for fiscal years 1978 through 1979 were excluded from the analyses because that data categorized youths entering the Reserve during their senior year of high school with those who dropped out of high school. It was therefore not possible to reliably differentiate between high school graduates and those individuals who did not graduate during the earlier cohort years. (Deficiencies in the data base that further limited the scope of analysis are discussed below in Section C of this chapter, and recommendations for reconstruction of the data base are discussed in Chapter V.) The remaining cohort years (FY80--FY82) provided at least two years of recent attrition history for each cohort, as well as individual characteristics and job-related factors corresponding to the reserve unit in which the individual first served.

In explaining attrition, the importance of conditions existing at the time the enlistment contract is entered, is apparent from labor market theories on market participation (job search) and the moonlighting employment context. Specifically, the economic theory suggests that individuals possessing little (or imperfect) knowledge about a job may require a trial period in the employment context before relevant job characteristics become known. Relative to participation in the Selected Reserve, it is reasonable to expect that information concerning these "experience" attributes or job characteristics unique to military service (such as regimentation, competition, inconvenience of scheduling, etc.), would be less well known to the non-prior service recruit than to the prior service recruit [Ref. 10: p. 26].

The application of moonlighting and job search theories to reserve force employment is complicated by the fact that potential recruits may be either former military members (prior service) or individuals with no previous military experience (non-prior service). Underlying differences

between the prior and non-prior service populations are evident in the manner in which they respond to changes in unemployment. Owing to the initial full-time training program, the Reserve is generally an attractive employment option to unemployed non-prior service individuals during periods of high unemployment. A decrease in the unemployment rate, however, lowers the number of unemployed workers and decreases job opportunities, both of which tend to reduce the number of non-prior service accessions.

The impact of declining unemployment on prior service personnel is more complex. On one hand, the tendencies discussed in relation to non-prior service individuals also apply to prior service personnel. On the other, retention in the active duty forces usually declines as unemployment is reduced. This increases the pool of active force veterans, a primary source of recruits for the Reserve. Over time, this effect may offset any decline in accessions induced by the decrease in unemployment. It should also be noted that under conditions of high unemployment, the active force is able to select only the higher quality recruits (both non-prior and prior service), leaving a large number of potential accessions with a taste for military life from which the Reserve may recruit. When unemployment declines, the active force and the Reserve must compete for the same people. [Ref. 2]

A 1983 time series study on the propensity of individuals to enlist in the Reserve underscored the fundamental differences between the non-prior and prior service populations [Ref. 34]. Among the non-prior service sample in this attitude survey, factors that were significantly dissimilar between non-prior service individuals with a positive propensity to enlist and those with a negative propensity, showed that the positive propensity individuals were more likely to:

(1) be younger,

TABLE VII

SAMPLE DISTRIBUTION BY PRIOR SERVICE STATUS AND COHORT YEAR, FY80--FY82

	Cohort Year			
	1980	1981	1982	Total
Prior service	6,449	7,051	6,962	20,462
Non-prior service	5,642	5,936	7,360	18,938
Total	12,091	12,987	14,322	
Grand Total				39,400

The IBM 3033 computer at Naval Postgraduate School was used in the manipulation of the DMDC data base. Frequency counts, crosstabulations, condescriptive analyses, correlations, and multivariate regression analyses for the prior service and non-prior service groups were performed using the Statistical Analysis System (SAS) [Ref. 32].

C. VARIABLE SELECTION

1. Identification of Dependent Variable

For the purposes of this thesis, attrition was defined as a loss which occurs before completion of the committed term of enlistment. The timing of an individual's departure from the Selected Reserve force, however, may represent differing influences during the term of enlistment. Additionally, losses from the Reserve which occur early in the term of enlistment are less costly in terms of the training investment that those associated with subsequent losses. Upon leaving a reserve unit, the individual may not only return to civilian life, but may also enter the active duty force, other Selected Reserve components, or the Individual Ready Reserve (IRR), Standby Reserve or Retired Reserve. Those individuals returning to the Selected Reserve

(2) have less formal education,

(3) belong to a racial or ethnic minority group,

(4) have friends who are either considering joining the military or have recently joined,

(5) not be homeowners, and

(6) be single.

Among prior service personnel, however, an entirely different set of factors were significant. Prior service personnel with a positive propensity to enlist differed from those with a negative propensity in that they were more likely to:

(1) feel that participating in the Reserve will help in their civilian jobs,

(2) be satisfied with their overall military experience,

(3) be satisfied with their military skills, and

(4) be dissatisfied with their ability to meet financial obligations since leaving the military service.

The data set was therefore initially stratified on the basis of prior service status in order to identify differences in attrition rates. The prior service group included all individuals in the cohort who entered regular drills and whose Pay Entry Base Date (PEBD) to military service was more than six months prior to the date of Selected Reserve gain (or who had indicated prior active duty service, in cases where PEBD information was missing). The non-prior service group was comprised of individuals in or awaiting training whose PEBD was within six months of Selected Reserve gain, and who did not definitively indicate prior active duty service. Individuals categorized by Training/Pay Category (TPC) as members of the National Guard and Retired Reserve, as well as individuals entering officer training pipelines, were excluded from both groups. A one-fifth sample of the remaining FY80--FY82 observations was then selected for analysis. The distribution of the 39,400 sample observations by prior service group and cohort year is shown by cohort year in Table VII .

not the individual left the Selected Reserve component: a value of one indicates that the individual attrited and a value of zero indicates that no unprogrammed loss occurred.

2. Candidate Independent Variables

Traditional theories of labor market participation and the attrition research previously undertaken provide a point of departure for preliminary identification of candidate explanatory variables. In order to facilitate analysis of attrition behavior, it is useful to aggregate the factors hypothesized to be relevant to the attrition decision into dominant categories of variables. For example, one such categorization scheme could be depicted as follows:

BIODEMOGRAPHIC
OCCUPATIONAL
COGNITIVE/AFFECTIVE/PERCEPTUAL
ECONOMIC

The first two categories of attrition-related variables are the focus of this thesis. That is, the investigation (for reasons discussed below) was limited primarily to information available during the recruitment process or at the time of enlistment: personal characteristics (biodemographics) and a limited spectrum of occupational characteristics, such as paygrade and term of enlistment. The value descriptions of candidate independent variables are presented in Table IX . (The value ranges reflected in Table IX were defined to ensure adequate cell sizes using preliminary frequency counts performed on the raw data.)

Frequency distributions and descriptive statistics for candidate independent variables are presented in Appendices A and B, for non-prior and prior service groups respectively. As shown in this data, a number of differences between the two groups are indicated. The non-prior service cohorts include a greater percentage of females than do the prior service cohorts: 28.84 percent of the non-prior service group are female, as compared to only 9.58 percent

or entering the active duty force may represent a greater return on the reserve training investment relative to those returning to civilian life or transferring to another reserve component. [Ref. 10: pp. 28-29]

The attrition criterion selected for analysis was ultimately defined as the individual's first loss from the Selected Reserve component if that loss occurred at least three months prior to the date on which the individual would have fulfilled the term of obligated service. These losses were then subcategorized by timing of the loss during the committed term and by whether or not the loss was to civilian life, including the Retired Reserve. Losses by reason of death were excluded from all analyses. The parameters of the attrition criterion are shown in Table VIII.

TABLE VIII

PARAMETERS OF THE ATTRITION CRITERION

Variable	Value	Description
Unprogrammed loss	0	No loss
	1	Time in commitment (length of commitment - 3 months)
	2	Time in commitment > (length of commitment - 3 months)
Time in commitment	(Months)	Date of loss - Date of gain
Destination	0	No loss
	1	Loss to civilian life (including Retired Reserve)
	2	Loss to other Army Selected Reserve units
	3	Loss to other Reserve (IRR and Standby Reserve)
	4	Loss to active duty

These attrition losses, then, can be represented by a dichotomous dependent variable which defines whether or

TABLE IX

CANDIDATE INDEPENDENT VARIABLES

Variable	Value	Description
Sex	1	Male
	2	Female
Race	1	Caucasian
	2	Black
	3	Hispanic
	4	Other
Marital Status	1	Single
	2	Married
Number of Dependents	0	None
	1	One
	2	Two or more
Age at Entry	(Years)	17-19 years
		20-24 years
		25 or more years
Education	0	Attending high school
	1	Non-high school graduate
	2	GED
	3	High school degree or more
AFQT[1]	93--100	Category I
	65--92	Category II
	50--64	Category IIIA
	31--49	Category IIIB
	0--30	Category IV--V
Cohort Year	(Years)	1980
		1981
		1982
Term of Enlistment	(Years)	1 year
		2 years
		3 years
		4 years
		5 years
		6 years
Paygrade at Entry		Nonprior Service:
	01	E1
	02	E2
	03-09	E3 and above
		Prior Service:
	01	E1
	02	E2
	03	E3
	04	E4
	05	E5
	06	E6
	07-09	E7 and above

1) Values correspond to Armed Forces Qualification Test (AFQT) percentile scores [Ref. 33: p. 21].

of the prior service group.In addition, non-prior service personnel are more likely to be single and have no dependents than are prior service personnel. As might be expected, non-prior service personnel are also younger than prior service personnel at entry: the mean age at entry for non-prior service personnel is 19.66 years, while that for prior service personnel is 27.33 years. In regard to educational attainment, 34.47 percent of the non-prior service individuals have a high school diploma, while 80.75 percent of prior service personnel had graduated from high school. Mean values for mental category, however, are essentially equivalent for the non-prior and prior service groups (3.68 and 3.41, respectively).

The fact that prior service personnel have had at least one previous tour of duty, is reflected in differences between the non-prior and prior service groups relative to occupational factors. Since length of previous active duty service may be applied to offset the six-year Selected Reserve service obligation, terms of enlistment for prior service individuals vary from one to six years. Terms of enlistment for non-prior service individuals, on the other hand, are concentrated in the six-year (86.93 percent) and three-year (12.41 percent) obligor groups. Additionally, non-prior service individuals enter the Selected Reserve at lower paygrades. Fully 92.49 percent of non-prior service personnel enter at the lowest paygrade (E1), while 76.13 percent of prior service personnel enter at paygrade E4 or higher.

As is apparent from the above discussion of non-prior and prior service group characteristics, the availability and nature of specific data elements comprising the cohort files limited the scope of investigation undertaken (and necessitates qualification of the research findings presented herein). In the first instance, it should be noted that the DMDC data base represents accessions to the

Selected Reserve forces. That is, no information concerning entry (or regains) of the cohort members into a given reserve unit was available in the data files, thus precluding analysis of unit entry or transfer effects. Further, although the data base does include Unit Identification Code (UIC) information for the unit of original accession, it was not possible to associate specific reserve units with each cohort member due to numerous administrative changes in the UIC coding system. Hence, unit characteristics potentially relevant to the attrition decision that were not available in the data set included: the type of unit (combat, combat support or administrative), the size of the unit, net drill time, and unit specific institutional policies.

Other potentially significant features of the Selected Reserve environment not addressed in the data were: regional economic characteristics (unemployment rate, average per capita income, urban versus rural regional differences, etc.); distance travelled to the unit by the member for drill activities; and, perhaps most importantly, the civilian work environment of the reservist (type of occupation, size of firm, the civilian wage, availability of overtime, employer's attitude, spouse's annual earnings, etc.). Finally, certain features of the data base construction and file maintenance (missing data elements, infrequent periodicity in matching to the master files, etc.) introduced a lack of continuity in the data on both personal and occupational characteristics. While adequate, for the purposes of the preliminary analyses presented in this chapter, this data did exhibit deficiencies in tracking changes which occur during the term of service; for example, changes in family status. (A more detailed discussion of these deficiencies, along with recommendations for reconstruction of the data base, are provided in Chapter V.)

D. RESULTS OF PRELIMINARY ANALYSES

1. Overall Attrition by Timing of Losses

To explore possible differences in patterns of attrition between the non-prior and prior service groups, loss rates were initially calculated from data on the first losses from the Selected Reserve of attriting reservists. (For instances of multiple losses associated with a given reservist, subsequent losses were disregarded in the analyses.) These "first loss" rates represent the percent of each cohort that attrited from the Selected Reserve component to civilian life, to other Reserve components (IRR or Standby Reserve), or to the active duty forces; provided that the attrition occurred at least three months prior to the expiration of obligated service (i.e., unprogrammed losses). Overall attrition from the Selected Reserve during the first two years of Reserve service is shown in Table X by timing of the losses.

TABLE X

OVERALL ATTRITION RATES BY TIMING OF LOSS, NON-PRIOR SERVICE AND PRIOR SERVICE, FY80--FY82 COHORTS

Timing of Loss	Non-Prior Service	Prior Service
0--6 months	7.54	7.68
7--12 months	10.35	10.81
13--18 months	11.66	6.63
19--24 months	10.86	3.28
First two years	40.41	28.40

During the first two years of reserve service, 40.41 percent of the non-prior service group were lost to all loss categories, while 28.4 percent of the prior service group were lost. Additionally, the timing of overall attrition during the first two years of service differed between the two groups. The attrition rates for prior service personnel

were highest in the 7--12 month interval (10.81 percent) and decreased sharply after the first year of Selected Reserve service. No such decline in the rates of attrition for non-prior service personnel were evident: non-prior service attrition rates were relatively more stable throughout the twenty-four month period, than those for prior service reservists, with the lowest rate of non-prior service attrition (7.54 percent) occurring in the 0--6 month interval and the highest rate (11.66 percent) occurring in the 13--18 month interval.

2. Overall Attrition by Destination of Losses

As shown in Table XI for the non-prior service group and in Table XII for the prior service group, attrition rates for the prior service and non-prior service groups during the first two years of service differed not only by timing, but also by destination of the losses. Losses to three destinations were considered: losses to civilian life, denoting a complete severance from the military; losses to other reserve components, specifically the IRR and the Standby Reserve; and losses to active duty forces, representing those individuals released from their reserve contracts to enlist in the regular army.

The three non-prior service cohorts display roughly the same pattern of attrition relative to loss destinations. During the 0--6 and 7--12 month intervals, the preponderance of non-prior service losses are to civilian life, possibly reflecting unsatisfactory performance during the initial training period. After the first twelve months of Selected Reserve service, however, the majority of losses are to other reserve components. As noted in Chapter I, administrative board review of transfers to the IRR were eliminated in 1982, thus facilitating transfer of reservists charged with non-participation at the discretion of unit commanders.

This could account for the high post-12 month rates of attrition to other reserve components, particularly in the 1980 and 1981 non-prior service cohorts.

For prior service personnel, the pattern of attrition is slightly different. Only in the 0--6 month interval is the attrition rate to civilian life greater that that to other reserves, and the differential by loss destination is not so great as that for non-prior service personnel. The most consistent feature of the prior service attrition rates, however, is that attrition to all destinations decreases after the initial twelve months of Selected Reserve service. Moreover, this reduction in attrition is apparent for all prior service cohorts.

3. Survival Behavior of Non-Prior and Prior Service Groups

As previously mentioned, losses to civilian life represent the most costly form of attrition, in that there is no return to the military on the training investment following the loss. The remainder of the preliminary analyses presented in this chapter therefore examine these unprogrammed losses to civilian life. (The regression analyses described in Chapter IV do, however, address all loss destinations.) Table XIII summarizes non-prior and prior service attrition rates for unprogrammed losses to civilian life during the first two years of Selected Reserve service. Total attrition to civilian life for non-prior service individuals was 19.93 percent, while that for prior service members was only 10.23 percent. This difference in rates of attrition from military service between the two groups was also apparent for each of the cohort year groups, as well.

Further examination of these differences in the attrition behavior of non-prior and prior service populations was accomplished through the use of cohort analysis techniques. The cohort analysis approach employs statistics which describe the percent of the identified group (here, the non-prior and prior service populations) entering

TABLE XI

FIRST LOSS ATTRITION RATES BY TIMING AND DESTINATION OF LOSSES, NON-PRIOR SERVICE, FY80--FY82 COHORTS

Destination	0--6 Months	7--12 Months	13--18 Months	19--24 Months
		FY80 Cohort		
Percent of cohort lost:				
To civilian life	6.97	6.35	3.35	2.61
To other Reserve	0.27	1.17	4.11	6.59
To active forces	0.27	2.61	2.45	1.08
Total percent lost	7.51	10.13	9.91	10.28
		FY81 Cohort		
Percent of cohort lost:				
To civilian life	6.55	7.46	3.47	2.38
To other Reserve	0.42	1.31	3.93	6.47
To active forces	0.08	1.87	2.21	1.75
Total percent lost	7.05	10.64	9.61	10.60
		FY82 Cohort		
Percent of cohort lost:				
To civilian life	7.69	7.09	3.38	2.55
To other Reserve	0.27	2.07	8.64	7.31
To active forces	0.11	1.28	2.88	1.67
Total percent lost	8.07	8.44	14.90	11.53
		All Cohorts		
Percent of cohort lost:				
To civilian life	7.06	6.96	3.39	2.50
To other Reserve	0.33	1.55	5.76	6.84
To active forces	0.15	1.84	2.51	1.52
Total percent lost	7.54	10.35	11.66	10.86

Selected Reserve service in a given fiscal year, that has "survived" to the beginning of discrete length of service intervals. Equivalently, the percent of each cohort that leaves during each length of service interval can be analyzed using this technique. That is, survival is regarded as the complement of attrition:

Survival prob. = 1.00 - attrition prob. (eqn 3.1)

Length of service distributions of the calculated survival or attrition probabilities, then, are expected to vary as a function of the group characteristics.

Calculation of survival functions is accomplished by scaling completed length of service into unit intervals of time, (x_i, x_{i+1}), where $i = 0, 1, 2, \ldots, k$, and x_{k+1} is the maximum length of service. Empirical completed length of service (CLS) distributions are then constructed, showing either the number of cohort members surviving to each of the times x_i or the number of cohort members leaving during each of the intervals (x_i, X_{i+1}). The number of survivors to time x_i, denoted Z_i, is related to the number of leavers, L_i, as follows:

$$Zi = \sum_{j=i}^{k} Lj \qquad \begin{matrix}(i = 1, 2, \ldots, k) \\ (j = i, i+1, i+2, \ldots, k)\end{matrix} \qquad \text{(eqn 3.2)}$$

Assuming that the cohort groups are homogeneous and that the survival behavior of group members is independent, both Z_i (number of survivors) and L_i (number of leavers) are binomial random variables. Based on the empirical CLS distribution, probability functions can be developed by calculating the proportion of the cohort that survives for a length of time x coinciding with the x_i's or the proportion that leaves during interval (x_i, x_{i+1}):

1. The probability that a recruit will survive to time x_i can be estimated by:

TABLE XII

FIRST LOSS ATTRITION RATES BY TIMING AND DESTINATION OF LOSSES, PRIOR SERVICE, FY80--FY82 COHORTS

Destination	0--6 Months	7--12 Months	13--18 Months	19--24 Months
		FY80 Cohort		
Percent of cohort lost:				
To civilian life	4.93	3.97	2.45	1.07
To other Reserve	3.07	6.31	4.49	2.20
To active forces	0.89	0.82	0.45	0.16
Total percent lost	8.89	11.10	7.39	3.43
		FY81 Cohort		
Percent of cohort lost:				
To civilian life	4.19	3.35	1.93	0.74
To other Reserve	2.24	6.84	3.96	2.61
To active forces	0.89	0.87	0.34	0.18
Total percent lost	7.32	11.06	6.23	3.53
		FY82 Cohort		
Percent of cohort lost:				
To civilian life	3.51	2.74	1.32	0.40
To other Reserve	3.35	6.39	4.39	2.27
To active forces	0.59	0.68	0.30	0.07
Total percent lost	7.45	9.81	6.01	2.74
		All Cohorts		
Percent of cohort lost:				
To civilian life	4.08	3.47	1.93	0.75
To other Reserve	2.83	6.56	4.34	2.39
To active forces	0.77	0.78	0.37	0.15
Total percent lost	7.68	10.81	6.64	3.29

TABLE XIII

ATTRITION TO CIVILIAN LIFE DURING THE FIRST TWO YEARS BY PRIOR SERVICE STATUS AND COHORT YEAR, FY80--FY82

	Cohort Year			
	1980	1981	1982	Total
Percent of cohort lost:				
Non-prior Service	19.27	19.86	20.72	19.93
Prior Service	12.42	10.21	7.97	10.23

$$G_i = Z_i/Z_o \qquad (i = 1, 2, \ldots, k) \qquad \text{(eqn 3.3)}$$

Where: G_i = Pr (Recruit survives to x_i)
Z_o = Original cohort size;

2. The conditional probability that a recruit will survive to time x_{i+1}, given that the recruit has survived to time x_i, can be estimated by:

$$Q_i = Z_{i+1}/Z_i \qquad (i = 1, 2, \ldots, k) \qquad \text{(eqn 3.4)}$$

Where: Q_i = Pr (Recruit with length of service x_i, survives to length of service x_{i+1});

3. The probability that a recruit will leave during (x_i, x_{i+1}) can be estimated by:

$$f_i = L_i/Z_o \qquad (i = 1, 2, \ldots, k) \qquad \text{(eqn 3.5)}$$

Where: f_i = Pr (Recruit leaves during $[x_i, x_{i+1}]$)
Z_o = Original cohort size.

[Ref. 35: pp. 16-24, 32-33]

The calculated proportions shown in Table XIV and Table XV describe: 1) the percent of the original cohort group which "survived" (i.e., did not attrite to civilian life at least three months prior to the expiration of obligated service) to the beginning of each six month length of service interval during the first two years of service (the likelihood of survival or G_i), and; 2) the percent of survivors to the previous six month interval who remained in

service to the next interval (the likelihood of continuation or Q_i).

This data demonstrates variability in the patterns of survival for the non-prior and prior service groups. As demonstrated in Table XIV for non-prior service cohorts and in Table XV for prior service cohorts, the likelihood of survival for non-prior service reservists is lower in each interval than for prior service in corresponding intervals. In addition, the likelihood of of survival for the non-prior service group decreases more rapidly than for the prior service group over time. The likelihood of continuation for both groups moves in the opposite direction, increasing with months of service, and is consistently lower for the non-prior service cohorts.

As noted in Chapter I, however, non-prior service recruits are required to serve at least twelve weeks in initial active duty for training (which may be split into two intervals), whereas prior service recruits enter the drilling units directly. Moreover, previous research on turnover within the Selected Reserve [Ref. 24: p. 205], indicated that the attrition process associated with initial training status may differ from that associated with post-training status losses. A more valid comparison of the non-prior service and prior service groups, therefore, can be achieved by contrasting the survival behavior of the prior service reservists with that of non-prior service reservists who had completed IADT and were serving in a drilling status. In effect, then, this comparison assesses survival behavior relative to drill unit entry and loss, for both non-prior service and prior service cohort members.

In order to accomplish this comparison, non-prior service reservists who attrited while awaiting training or while in training, were deleted from the sample. (A total of 2,378 non-prior service observations were deleted, leaving 16,636 observations for analysis.) The length of service

TABLE XIV

SURVIVAL AND CONTINUATION BY MONTHS OF SERVICE, NON-PRIOR SERVICE, FY80--FY82 COHORTS (PROPORTIONS)

Months of Service	Survival	Continuation
	FY80 Cohort	
0--6 months	93.03	93.03
7--12 months	86.69	93.18
13--18 months	83.34	96.14
19--24 months	80.07	96.87
	FY81 Cohort	
0--6 months	93.34	93.34
7--12 months	85.98	92.01
13--18 months	82.51	95.96
19--24 months	80.14	97.12
	FY82 Cohort	
0--6 months	92.45	92.45
7--12 months	85.22	92.32
13--18 months	81.83	96.03
19--24 months	79.28	96.88
	All Cohorts	
0--6 months	92.80	92.80
7--12 months	85.71	92.35
13--18 months	82.24	95.96
19--24 months	79.69	96.89

cells were then converted into one month intervals (as opposed to six month intervals) and, because exact length of training data for each reservist was unknown, the median duration of initial training (five months) was subtracted from time served in commitment for non-prior service reservists. Resultant length of service cells for both non-prior service and prior service reservists accordingly approximated time served, in months, while attached to a drilling unit. The completed length of service distributions by months of drill unit service for each cohort year are presented in Appendices C through E. Figures 3.1--3.3 depict the resultant survival curves for both groups by cohort year.

While these distributions must be interpreted with caution owing to imprecision in the construction of post-training time in service, the survival curves do indicate variability in the respective length of service distributions for each of the cohorts by prior service status: the higher rates of survival for prior service cohorts relative to those for non-prior service cohorts are evident at each monthly interval. Additionally, the survival behavior of prior and non-prior service cohorts becomes increasingly divergent over time, as shown by the greater separation between the curves in the second year (12--24 month) timeframe.

Because these distributions represent surviving cohort members (Z_i), frequencies within the CLS cells are highly correlated--survivors to time x_i will, in many cases, be represented in the frequency count of survivors to time X_{i+1}. For this reason, frequency counts of leavers (L_i) during the one-month CLS cells are more appropriate for tests of significance relative to the apparent differences in length of service between the two groups. Chi-square tests of marginal homogeneity were accordingly performed on the frequency counts of leavers during each one-month

TABLE XV

SURVIVAL AND CONTINUATION RATES BY MONTHS OF SERVICE, PRIOR SERVICE, FY80--FY82 COHORTS (PROPORTIONS)

Months of Service	Survival	Continuation
	FY80 Cohort	
0--6 months	95.07	95.07
7--12 months	91.09	95.82
13--18 months	88.65	97.31
19--24 months	87.58	98.79
	FY81 Cohort	
0--6 months	95.58	95.58
7--12 months	92.45	96.51
13--18 months	90.53	97.91
19--24 months	89.79	99.19
	FY82 Cohort	
0--6 months	96.49	96.49
7--12 months	93.75	97.16
13--18 months	92.43	98.59
19--24 months	92.03	99.56
	All Cohorts	
0--6 months	95.74	95.74
7--12 months	92.13	96.23
13--18 months	90.12	97.82
19--24 months	89.34	99.13

interval for both groups. These calculations confirmed a significant association between prior service status and length of drill unit service for all cohort years (p.0001).

4. Bivariate Analyses of Stayer/Leaver Subgroups

The observed differences in survival rates for the non-prior and prior service groups suggest that the determinants of attrition behavior may well differ between the two groups. Simple bivariate analyses were therefore performed to test for differences between stayer/leaver subgroups within the non-prior and prior service groups with regard to candidate independent variables. Stayer/leaver subgroups were defined for each six-month length of (total) service interval as unprogrammed losses to civilian life. Bivariate categorical distributions for each six-month interval were then constructed by creating contingency tables from stayer/leaver subgroup status in combination with all levels of each candidate independent variable. (A separate distribution was also developed for the non-prior service group corresponding to all initial training losses.) The results of Chi-square tests for homogeneity are presented in Appendices F and G, for the non-prior service and prior service groups respectively. Rates of attrition to civilian life during the first two years of service are shown in Table XVI for the non-prior and prior service groups by biodemographic and occupational characteristics.

Here, again, the two groups display different patterns of attrition behavior. The attrition rate for non-prior service females, for example, is greater that that for non-prior service males: 20.32 and 12.37 percent, respectively. For prior service personnel, however, the gender difference is not only less pronounced, but is also reversed, with that for males being 10.65 percent and for females being 6.21 percent.

The patterns of attrition by race also differ. The attrition rates for caucasians is slightly greater than that

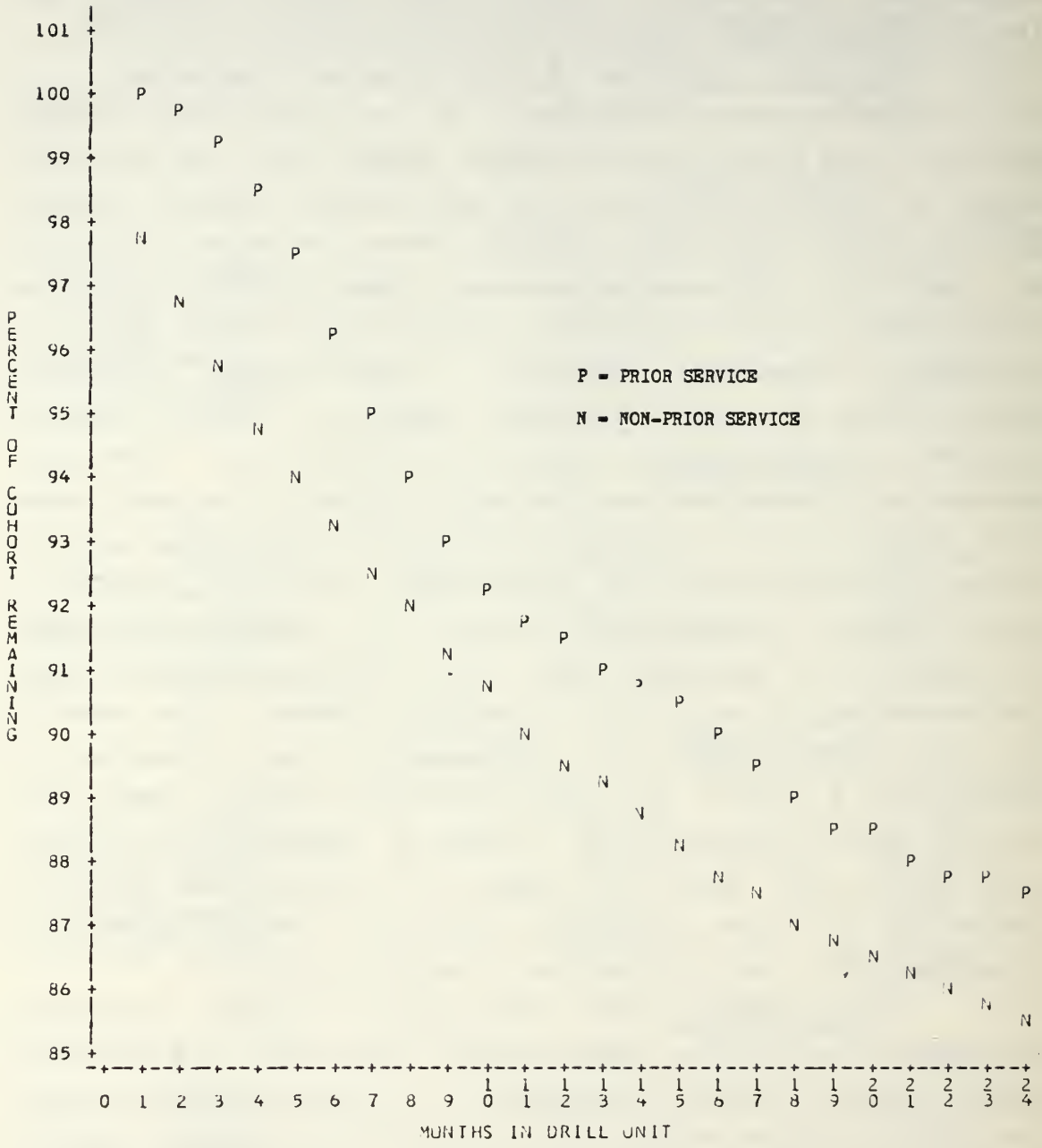

Figure 3.1 Survival Curves, FY80 Cohorts.

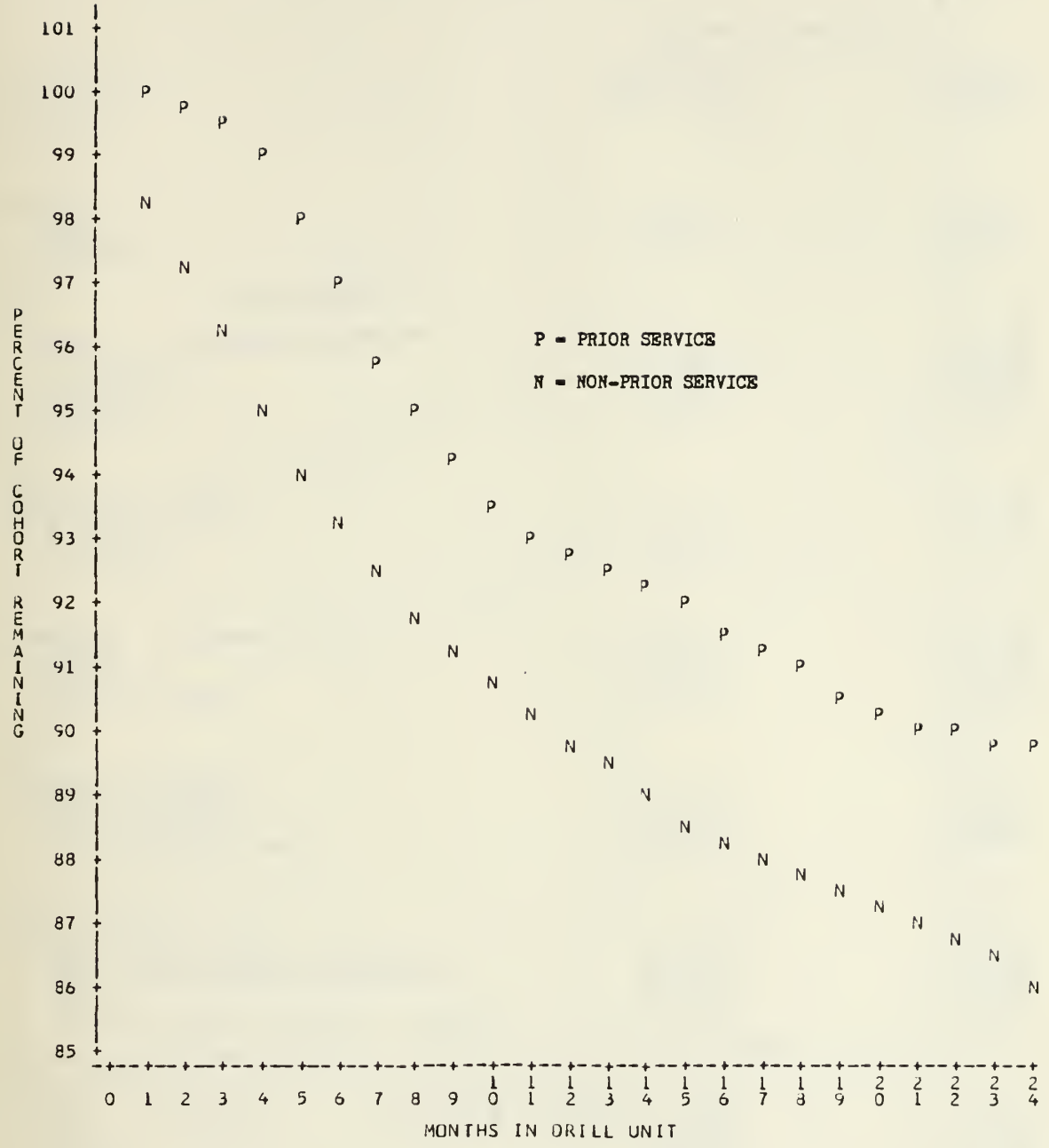

Figure 3.2 Survival Curves, FY81 Cohorts.

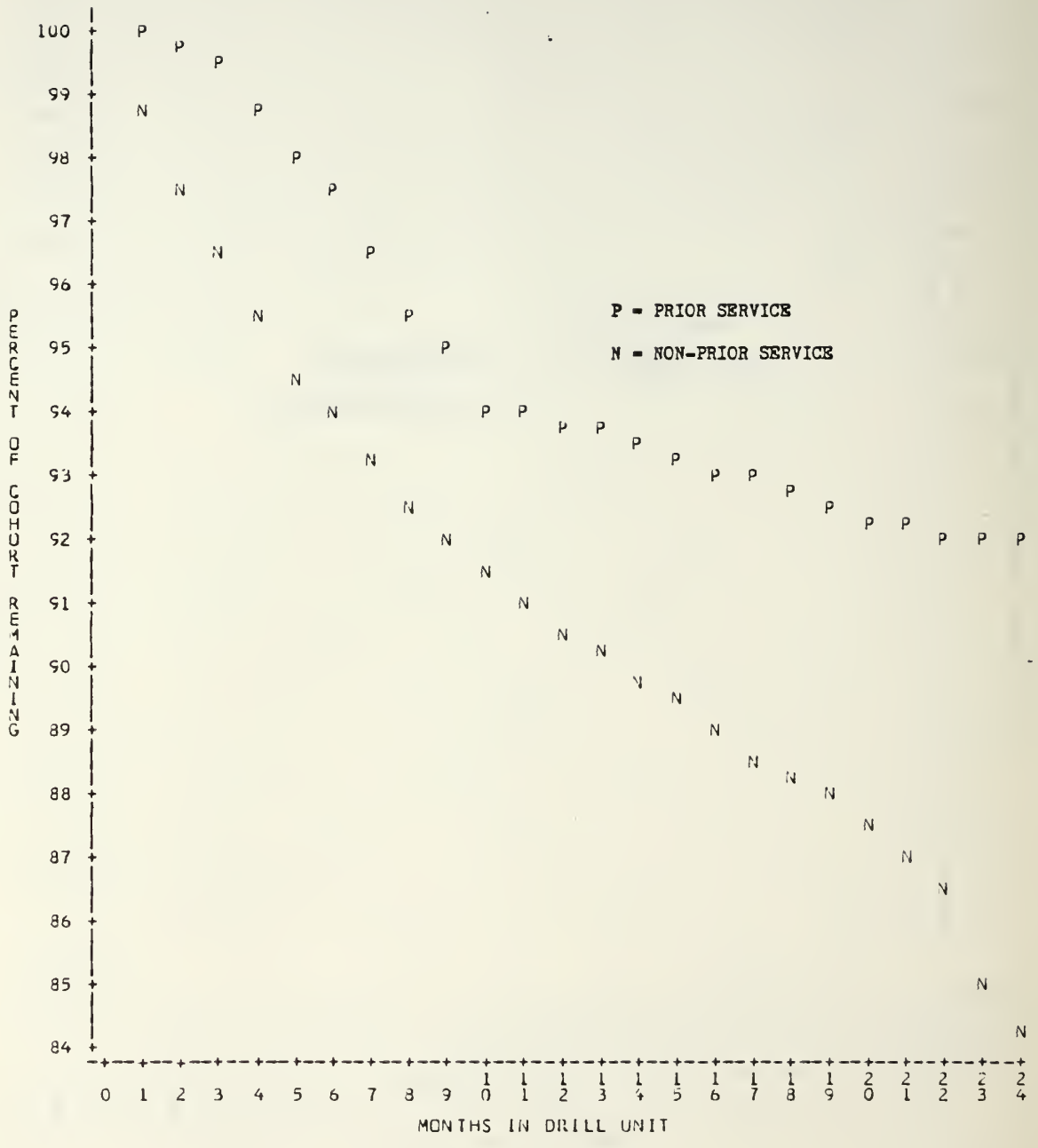

Figure 3.3 Survival Curves, FY82 Cohorts.

TABLE XVI

ATTRITION TO CIVILIAN LIFE DURING THE FIRST TWO YEARS BY PRIOR SERVICE STATUS, FY80--FY82 COHORTS

Variable	Rates of Attrition	
	Non-Prior Service	Prior Service
Sex		
Male	12.37	10.65
Female	20.32	6.21
Race		
Caucasian	15.12	10.35
Black	13.51	12.83
Hispanic	6.75	10.96
Other	14.91	9.93
Marital Status		
Single	14.24	14.37
Married	19.36	9.01
Number of Dependents		
None	14.43	14.35
One	20.00	11.57
Two or more	17.94	8.12
Age at Entry		
17-19 years	13.93	12.92
20-24 years	15.39	14.95
25 or more years	17.23	7.80
Education		
Attending high school	9.09	11.76
Non-high school graduate	15.77	14.50
GED	21.56	8.65
High school degree or more	11.94	10.41
Mental Category		
I	7.88	6.77
II	10.39	7.39
IIIA	13.86	10.09
IIIB	16.55	11.13
IV-V	15.45	11.45

Table XVI

Attrition to Civilian Life During the First Two Years by Prior Service Status, FY80--FY82 Cohorts (cont'd.)

Variable	Rates of Attrition: Non-Prior Service	Rates of Attrition: Prior Service
Cohort Year		
1980	15.00	12.42
1981	14.97	10.20
1982	14.16	7.96
Term of Enlistment		
1 year	---	5.12
2 years	---	9.28
3 years	18.31	6.94
4 years	19.09	11.22
5 years	---	9.68
6 years	14.05	15.10
Paygrade at Entry		
E1	14.91	12.13
E2	8.93	12.49
E3--E9	11.67	---
E3	---	9.33
E4	---	12.19
E5	---	8.42
E6	---	5.69
E7--E9	---	2.74

for blacks in non-prior service cohorts, but slightly less than that for blacks in prior service cohorts. Both marital status and number of dependents are associated with different patterns of attrition in each group: married reservists with one dependent show the highest rates of attrition in the non-prior service group, while single prior service reservists with no dependents attrite more frequently than do married prior service reservists or those with one or more dependents. Also, the older age group (25 or more years) of non-prior service individuals show the highest rate of attrition, as compared to the 20--24 year old group of prior service individuals.

While attrition by mental category appears to be similar, the patterns of attrition by educational attainment are strikingly dissimilar between the non-prior service and prior service groups: the rate of attrition for GED certificate holders is highest among all educational categories for the non-prior service group, but lowest for the prior service group.

To investigate the relative importance of the candidate independent variables, correlations between the explanatory variables for each prior service status group and months of total Selected Reserve service (Y) were performed. The results of this informal analysis are summarized in Table XVII for non-prior service and in Table XVIII for prior service cohorts.

TABLE XVII

PEARSON PRODUCT-MOMENT CORRELATIONS
NON-PRIOR SERVICE, FY80--FY82

Variable	Correlation Coefficient	Prob.
Sex	-.01	.0836
Race	.02	.0141
Marital Status	.01	.2688
Number of Dependents	.02	.0294
Age at Entry	.05	.0001
Education	.09	.0001
Mental Category	-.11	.0001
Cohort Year	.06	.0001
Term of Enlistment	.07	.0001
Paygrade at Entry	.09	.0001
Time in Commitment (Y)	1.00	.0000

For non-prior service cohorts, variables having the highest zero order correlation with months of service were: mental category, educational attainment, and paygrade at entry; whereas for prior service cohorts, age at entry, number of dependents, and term of enlistment showed the highest correlations. Correlations between the candidate independent variables and time in service were generally lower for the non-prior service group: non-prior service correlations ranged from .01 (marital status) to -.11

TABLE XVIII

PEARSON PRODUCT-MOMENT CORRELATIONS
PRIOR SERVICE, FY80--FY82

Variable	Correlation Coefficient	Prob.
Sex	.05	.0001
Race	-.02	.0086
Marital Status	.16	.0001
Number of Dependents	.17	.0001
Age at Entry	.23	.0001
Education	.11	.0001
Mental Category	-.08	.0001
Cohort Year	.11	.0001
Term of Enlistment	-.17	.0001
Paygrade at Entry	.13	.0001
Time in Commitment (Y)	1.00	.0000

(mental category), with eight of the ten candidate independent variables showing significant association with time in service at the five percent level of significance. Prior service correlations, on the other hand, ranged from -.02 (race) to .23 (age at entry), with all candidate independent variables significantly correlated to time in service (p.05).

E. SUMMARY

In summary, the frequency distributions of candidate independent variables discussed above indicated that the population characteristics of the non-prior service and prior service groups were similar in terms of mental category, race, and distribution by cohort year; but differed relative to the remaining candidate independent variables. The bivariate analyses, on the other hand, revealed significant differences relative to the candidate independent variables between stayer and leaver subgroups within each prior service status grouping. These preliminary analyses suggest, inter alia, that attrition rates may vary substantially with both biodemographic and occupational factors, and that these variables are appropriate for inclusion in further analyses.

Possible interdependencies among the candidate independent variables could, however, confound the observed relationship between any given variable and attrition. If better educated recruits also achieve higher AFQT scores, for example, AFQT scores may in fact have little influence on attrition. Similarly, if age and paygrade are consistently related, the link between either of these characteristics and attrition may be misinterpreted.

Ultimately, in order to specify the conditional effects of each independent variable on attrition behavior, further analysis must control for the effects of the several variables simultaneously. The multivariate regression analyses described in Chapter IV were therefore undertaken to isolate single variable contributions to early attrition behavior, as well as interactions among variables; and to develop a causal model for predicting attrition behavior.

IV. MULTIVARIATE REGRESSION ANALYSES

This chapter presents the results of regression analyses performed to investigate the relationships between the candidate independent variables discussed in Chapter III and attrition. As previously mentioned, attrition is characterized by a dichotomous dependent variable which assumes a value of one if the individual attrited and a value of zero if no attrition occurred. Hence, for any time period t, each individual is categorized as either a stayer or a leaver by an outcome variable defined as:

Y_{it} = 0, if individual i stayed through time period t; and
1, if individual i attrited during time period t.

The regression technique used in the following analyses relates the vector of characteristics associated with individual i (i.e., the values of candidate independent variables) to attrition as follows:

$$Y = p(x_i) = p(Y_{it}=1|X_i), \qquad \text{(eqn 4.1)}$$

where $p(x_i)$ is the probability of attrition for individual i, and X_i is the vector of characteristics for individual i.

This relationship has been successfully described using a logist function asymptomatically approaching zero or one, such that the estimated probabilities reflect their natural bounds:

$$Y = \frac{1}{1 + e^{-(B_0 + B_1x_{i1} + B_2x_{i2} + \ldots + B_kx_{ik})}}, \qquad \text{(eqn 4.2)}$$

where k is the number of characteristics measured for individual i, and $B_0, B_1, \ldots, B_k$, are the regression parameters of the estimated model.

The quantitative relationship of each independent explanatory variable, $x_1, x_2, \ldots, x_k$, to the probability of

attrition, then, is assessed in the equation by its respective coefficient, B_0, B_1, . . . , B_k. Equivalently, the linear form of the logistic function can be expressed as:

$$Y' = \text{Ln}[Y/(1-Y)] = B_0 + B_1x_1 + B_2x_2 + \ldots + B_kx_k \quad \text{(eqn 4.3)}$$

For a full description of the logist function, see [Ref. 28].

Separate logist models were estimated for three time periods:

(1) The pre-training and training period (non-prior service only),

(2) The post-training period to two years in drill service (non-prior service only), and

(3) The first two years from the date of enlistment.

Hence, for each individual i, three outcome variables were defined representing whether or not the individual attrited during each time period. (Models for the pre-training and training time period and the post-training period to two years in drill service time period, were not constructed for the prior service population due to the small sample frequency of prior service reservists entering training.) Attriting individuals were, of course, excluded from models for all time periods subsequent to the period during which the attrition occurred. It should be noted, however, that for the non-prior service group, the model for the first two years from the date of enlistment (item (3), above) does include individuals attriting during the pre-training and training period.

Additionally, separate models were estimated for two destination parameters: 1) attrition to civilian life only, and 2) attrition to all loss destinations (i.e., to civilian life, to other Reserve components, and to active duty). Because losses to the IRR were not coded separately in the data base, it was not possible to perform separate analyses on these losses.

Finally, previous research conducted by Grissmer and Kirby had revealed major differences in the patterns of attrition for males and females, particulary with regard to the effects of race and age at entry [Ref. 10: p. 36]. For this reason, the scope of this investigation was limited to the male segment of the non-prior and prior service populations only.

In order to perform the regression analyses, reference categories of the independent values were identified for the non-prior and prior service groups based on the frequency distributions of population characteristics discussed in Chapter III. The reference categories for both non-prior and prior service groups were: caucasian, single, no dependents, 18--19 years old at entry, high school graduate, mental category IIIB, 1980 cohort year, and six-year obligor. The reference paygrades were E1 for the non-prior service group and E4 for the prior service group.

Dichotomous independent variables were then constructed for each value range of the candidate independent variables other than those values represented by the reference categories, such that each variable is equal to one if the individual has the characteristic and equal to zero if not. The value ranges so defined for the various model specifications do not, in all cases, correspond to those used in the preliminary analyses described in Chapter III: whenever possible (given the structure of the data base), value ranges consistent with the previous research described in Chapter II were constructed to facilitate comparison of findings. See particularly, [Refs. 26,10]. (Also, it was necessary to re-define values ranges of the candidate independent variables to ensure that no value range would create an empty cell in a contingency table relating that variable to the dependent variable, resulting in spurious indications of association between the independent and dependent variable.)

For each model, then, selected candidate independent variables were entered into regression equations with the logistic of attrition, in order to measure the individual explanatory power of attrition probability among those variables. Variables which were entered into each model were: race, marital status, age at entry, educational attainment, and mental category. Stepwise regression techniques were employed to test each of the remaining variables for inclusion in the logistic function (i.e., nonsignificant and linearly redundant variables were eliminated). Variables which were considered for (stepwise) inclusion in the models were: term of enlistment, paygrade at entry, number of dependents, and cohort year.

The tabular displays of regression results presented in this chapter report attrition probabilities calculated from Equation 4.2 for an individual with the designated characteristics. Probabilities of attrition are given first for the reference individual; and then for individuals who differ from that reference individual on each characteristic, after controlling for all other characteristics. In contrast to the empirically observed rates of attrition presented in Chapter III, these predicted probabilities of attrition were computed from Equation 4.2 using the regression coefficients (B_0, B_1, . . . B_k) generated by the logist regression procedure. For example, in Table XIX the two-year attrition probability for the non-prior service reference individual is .163 (16.3 percent). If an individual were black but had all other characteristics of the reference individual, the modelled probability of attrition would be .139, representing a .024 decrease in attrition probability. This decrease in attrition probability is shown in the "Change" column of each table. Starred entries show characteristics which are significant at the five percent level (i.e., characteristics for which regression coefficients differ significantly from zero at p.05). The actual

regression coefficients, associated p-values, and model R^2 values for each model specification are presented in Appendices H through K.

A. RESULTS OF NON-PRIOR SERVICE REGRESSION ANALYSIS

Table XIX shows the calculated probabilities of attrition to civilian life (only) for males with no prior service during the first twenty-four months of Selected Reserve service. With the exception of marriage, all the variables in the model are significant at the five percent level (p.05). Term of enlistment, paygrade at entry, dependents, and cohort year did not, however, contribute sufficiently to the explanatory power to be added to the model in the stepwise procedure. The results of this model are generally consistent with previous research findings: relative to the reference group, the probability of attrition is less for minority races and the higher mental categories (I--IIIA); and greater for older entrants (twenty years or more) and those with less education (non-high school graduates and GED certificate holders). The strongest effects are those associated with educational attainment and the upper mental categories.

Table XX presents the calculated probabilities of attrition for the same population (non-prior service males) and time period (0--24 months service), but considers losses to all destinations. All of the candidate independent variables assessed in the stepwise procedure, were sufficiently significant to enter this model. Although the variable for the twenty-five year or older age range (which had been forced into the model specification) is not statistically significant at the five percent level, this model does confirm the direction of effects exhibited in the model for losses to civilian life only. (The one exception is that the direction of effect for the variable, black, is reversed; however, this variable is not statistically significant in the second model.) It is interesting to note that both

TABLE XIX

TWO-YEAR ATTRITION PROBABILITIES, NON-PRIOR SERVICE MALES
LOSSES TO CIVILIAN LIFE ONLY

	Attrition Probability	Change
Reference Individual[1]	.163	--
Race		
Black	.139	-.024 *
Other	.131	-.032 *
Married	.185	.022
Age at Entry		
17 years	.138	-.025 *
20--24 years	.183	.020 *
25 or more years	.201	.038 *
Education		
Non-H.S. graduate	.201	.038 *
GED	.247	.084 *
Mental Category		
I	.099	-.064 *
II	.114	-.049 *
IIIA	.139	-.049 *
IV--V	.140	-.023 *

(1) Caucasian, single, no dependents, 18--19 years old, high school graduate, mental category IIIB, 1980 cohort, six-year obligor, and E1.

(*) Regression coefficient significant at p.05.

TABLE XX

TWO-YEAR ATTRITION PROBABILITIES, NON-PRIOR SERVICE MALES
LOSSES TO ALL DESTINATIONS

	Attrition Probability	Change
Reference Individual[1]	.314	--
Race		
Black	.331	.017
Other	.287	-.027 *
Married	.357	.061
Age at Entry		
17 years	.268	-.046 *
20--24 years	.337	.023 *
25 or more years	.329	.015
Education		
Non-H.S. graduate	.427	.113 *
GED	.539	.225 *
Mental Category		
I	.176	-.138 *
II	.223	-.091 *
IIIA	.264	-.050 *
IV--V	.268	-.046 *
Three year term of enlistment	.435	.121 *
Paygrade E2--E9	.263	-.051 *
Some dependents	.257	-.057
Cohort Year		
1981	.320	.006
1982	.358	.044 *

(1) Caucasian, single, no dependents, 18--19 years old, high school graduate, mental category IIIB, 1980 cohort, six-year obligor, and E1.

(*) Regression coefficient significant at p.05.

models predict a higher likelihood of attrition for married reservists, while the model for all loss destinations predicts a lower likelihood of attrition for those with dependents. These findings would suggest that the variable for number of dependents may represent a proxy index of family stability, greater financial obligations, and other factors which tend to suppress labor market mobility; while marriage, per se, may reflect a dominance of conflicting family obligations.

The results presented in Table XIX and in Table XX also confirm the findings of Grissmer and Kirby in their study of the fiscal year 1980 non-prior service cohort [Ref. 10: p. 35]. Although the model specification employed in this thesis differs from that utilized by Grissmer and Kirby, the variables common to both studies do reflect the same direction of effects, with the exception of Mental Category IV. The Grissmer and Kirby study found that the probability of attrition increases for Mental Category IV reservists, while this study indicates that the attrition probability is reduced (relative to Mental Category IIIB reservists) for these individuals. This discrepancy in findings may derive from differences in the variable descriptions: Grissmer and Kirby utilized a variable for mental category group as recorded in the Reserve Components Common Personnel Data System (RCCPDS)--since these mental category groups did not differentiate Mental Category IIIA from Mental Category IIIB, they did not analyze Mental Category IIIA and IIIB separately (nor did they include Mental Category V individuals). The mental category ranges used in this study, on the other hand, were developed from Armed Forces Qualification Test (AFQT) percentile scores. (See Chapter III, Section (C).)

Finally, the results shown in Table XX indicate that the probability of attrition during the first two years of Selected Reserve service is higher for those reservists who

enlist for three years (as opposed to six years), but lower for those entering Selected Reserve service at paygrade E2 or higher. These findings could reflect a greater motivational commitment to military service on the part of six-year obligors and the higher qualification standards (educational and entrance test achievement) requisite to entry at the higher paygrades.

The two final non-prior service model specifications represent attrition to civilian life during the pre-training and training period, and during the post-training period to two years in service. Reservists attriting before or during training were accordingly deleted from the sample used in the post-training regression analysis, but had been included in the sample used in the model specification for the period from date of enlistment to two years in service (Table XIX). The reference group attrition probabilities for the final model specifications (.044 and .016, respectively) therefore do not sum to the probability of attrition for the two-year model (.163), since the latter reflects the composite effects of both pre-training/training and post-training attrition.

The model depicted in Table XXI represents losses to civilian life by non-prior service males during the pre-training and initial training period. As Table XXI illustrates, attrition probabilities during this time period appear to be markedly different than those during the first two years of service (cf., Table XIX and Table XX). In this model, the only variables significant at the five percent level (p.05) are: the seventeen and over twenty-five year age ranges, education, Mental Categories II and IIIA, three-year term of enlistment, and the variables for cohort year. The actual occurence of attrition during this time period was, however, relatively infrequent: the empirically observed rate of attrition for the non-prior service group during the pre-training and training period was .068. Hence,

TABLE XXI

PRE-TRAINING AND TRAINING ATTRITION PROBABILITIES
NON-PRIOR SERVICE MALES, LOSSES TO CIVILIAN LIFE ONLY

	Attrition Probability	Change
Reference Individual[1]	.044	--
Race		
Black	.038	-.006
Other	.042	-.001
Married	.096	.053
Age at Entry		
17 years	.056	.012 *
20--24 years	.045	.001
25 or more years	.040	-.004 *
Education		
Non-H.S. graduate	.052	.008 *
GED	.046	.002 *
Mental Category		
I	.047	.003 *
II	.039	-.005
IIIA	.054	.010 *
IV--V	.039	-.005
Three year term of enlistment	.035	-.009 *
Paygrade E2--E9	.049	.005
Some dependents	.022	-.022
Cohort Year		
1981	.066	.022 *
1982	.072	.028 *

(1) Caucasian, single, no dependents, 18--19 years old, high school graduate, mental category IIIB, 1980 cohort, six-year obligor, and E1.

(*) Regression coefficient significant at p.05.

the fact that only nine of the seventeen variables are statistically significant, would suggest that the logist regression procedure itself may lack the degree of sensitivity necessary to successfully model these effects.

With the exception of education, Mental Category II, and cohort year, each of the significant variables moves the attrition probabilities in opposite directions than those evidenced in the models for the other time periods. Given the pervasive lack of statistical significance, any interpretation of these results would be tenuous, at best. It is, however, apparent that attrition during the training period should be differentiated from that during the post-training period, as the respective attrition processes themselves likely reflect entirely different behavioral relationships.

The results of the model for non-prior service males losses to civilian life from post-training to two years in drill, are displayed in Table XXII. The variables assessed for entry in the stepwise procedure (paygrade, dependents, and cohort year) were not sufficiently significant to enter the model, with the exception of three-year term of enlistment. The results of this last non-prior service regression model coincide with those discussed in conjunction with the two-year models for losses to civilian life and losses to all destinations, except for the lack of statistical significance associated with other race, the twenty to twenty-four year age range, and Mental Category IV--V.

B. RESULTS OF PRIOR SERVICE REGRESSION ANALYSIS

Table XXIII presents the probabilities of attrition to civilian life for prior service males during the first twenty-four months of reserve service. All of the candidate independent variables entered into the model; however, only mental category, paygrade E5--E9, one to five year term of enlistment, and cohort year are statistically significant (p.05). These variables are associated with lower probabilities of attrition relative to the reference group. As in

TABLE XXII

POST-TRAINING TO TWO YEARS ATTRITION PROBABILITIES
NON-PRIOR SERVICE MALES, LOSSES TO CIVILIAN LIFE ONLY

	Attrition Probability	Change
Reference Individual[1]	.016	--
Race		
Black	.098	-.008
Other	.081	-.025
Married	.123	.017
Age at Entry		
17 years	.078	-.028 *
20--24 years	.115	.009
25 or more years	.144	.038 *
Education		
Non-H.S. graduate	.146	.040 *
GED	.176	.070 *
Mental Category		
I	.050	-.056 *
II	.068	-.039 *
IIIA	.082	-.024 *
IV--V	.096	-.010
Three year term of enlistment	.126	.020 *

(1) Caucasian, single, no dependents, 18--19 years old, high school graduate, mental category IIIB, 1980 cohort, six-year obligor, and E1.

(*) Regression coefficient significant at p.05.

the model for non-prior service males during the pre-training and training period, the lack of statistical significance would indicate that the model specification does not capture the behavioral relationships which account for prior service attrition to civilian life.

As shown in Table XXIV, when losses to all destinations during the first two years of Selected Reserve service are considered, the model for the prior service male population includes a greater number of statistically significant variables: other race, the twenty-five year or older age range, non-high school graduate, Mental Categories I--IIIA, one to five year term of enlistment, paygrades E5--E9, and cohort year. The lower probabilities of attrition for older prior service reservists and those in the higher paygrades (E5--E9) may, in this case, reflect correspondingly greater levels of reserve career commitment (owing, perhaps, to the temporal proximity of retirement benefits). The directions of the other significant effects are consonant with previous research findings: lower probabilities of attrition are associated with other race and the upper mental categories (I--IIIA), and higher probabilities of attrition are associated with the non-high school graduate educational category. It is interesting to note that only in this model is the direction of effect for Mental Category IV--V as expected: higher (albeit not significant) attrition is associated with these prior service reservists.

Although not particularly conclusive, the models for prior service males do tend to confirm differences between the non-prior service and prior service populations. For non-prior service males, entering the Reserve at a young age (seventeen years) reduces the probability of attrition; but for prior service males, entering when older lowers the likelihood of attrition. Similarly, terms of enlistment less than six years in length are associated with higher attrition probabilities for the non-prior service population, but

TABLE XXIII

TWO-YEAR ATTRITION PROBABILITIES, PRIOR SERVICE MALES
LOSSES TO CIVILIAN LIFE ONLY

	Attrition Probability	Change
Reference Individual[1]	.207	--
Race		
Black	.209	.002
Other	.185	-.022
Married	.212	.005
Age at Entry		
17 years	.498	.291
20--24 years	.226	.019
25 or more years	.198	-.009
Education		
Non-H.S. graduate	.215	.008
GED	.192	-.015
Mental Category		
I	.154	-.052 *
II	.151	-.056 *
IIIA	.166	-.041 *
IV--V	.157	-.050 *
One to five year term of enlistment	.095	-.112 *
Paygrade		
E1--E3	.187	-.020
E5--E9	.174	-.033 *
Some dependents	.203	-.004
Cohort Year		
1981	.177	-.030 *
1982	.163	-.044 *

(1) Caucasian, single, no dependents, 18--19 years old, high school graduate, mental category IIIB, 1980 cohort, six-year obligor, and E4.

(*) Regression coefficient significant at p.05.

they lower the likelihood of attrition for the prior service population. The direction of effect for cohort year is also reversed between the two groups: attrition probabilities increase with cohort year in the non-prior service population, but decrease in the prior service population. Finally, comparison of the non-prior service and prior service models indicates that the effect of educational attainment (specifically, the non-high school graduate and GED categories) is more significantly associated with increased probabilities of attrition in the non-prior service population, than in the prior service population.

C. SUMMARY

In summary, the regression results for blacks tended to be inconclusive for both populations: this variable was significant only in the non-prior service model for losses to civilian life during the first two years of service, in which "black" was associated with lower probabilities of attrition. The race category "other" did, however, exhibit consistently lower attrition probabilities relative to "caucasian" in the first two-year model specifications for both populations. Being married was not significant in any of the models, nor was having dependents ever significant at the five percent level (p.05).

Entering the Selected Reserve at seventeen years of age appears to lower the likelihood of attrition for non-prior service males (except during the pre-training and training period), but is not significant for prior service males in any of the model specifications. Entering in the mid-range age group (20--24 years of age) tends to raise attrition probabilities for non-prior service males during the first two years of reserve service, but again, is not significant in the prior service model specifications. Entering at an older age (25 or more years) seems to raise attrition probabilities for non-prior service males in the model for losses to civilian life during the first two years and in

TABLE XXIV

TWO-YEAR ATTRITION PROBABILITIES, PRIOR SERVICE MALES LOSSES TO ALL DESTINATIONS

	Attrition Probability	Change
Reference Individual[1]	.478	--
Race		
Black	.489	.011
Other	.421	-.057 *
Married	.487	.009
Age at Entry		
17 years	.529	.051
20--24 years	.486	.008
25 or more years	.396	-.082 *
Education		
Non-H.S. graduate	.573	.095 *
GED	.485	.007
Mental Category		
I	.421	-.057 *
II	.435	-.043 *
IIIA	.475	-.003 *
IV--V	.480	.002
One to five year term of enlistment	.243	-.235 *
Paygrade		
E1--E3	.480	.002
E5--E9	.449	-.029 *
Some dependents	.437	-.041
Cohort Year		
1981	.430	-.048 *
1982	.440	-.039 *

(1) Caucasian, single, no dependents, 18--19 years old, high school graduate, mental category IIIB, 1980 cohort, six-year obligor, and E4.

(*) Regression coefficient significant at p.05.

the post-training model, but to lower attrition during the pre-training/training period. For prior service males, entering in this age range was significant only in the model for losses to all destinations during the first two years, in which the older entry age was associated with lower probabilities of attrition.

Non-high school graduates and GED certificate holders have higher probabilities of attrition in the non-prior service population. This relationship was evident in the prior service population with respect to the non-high school degree category, but only for losses to all destinations during the first two years of service. Individuals in Mental Categories I through IIIA have lower attrition probabilities relative to the reference group (Mental Category IIIB) in both populations.

Entering the Selected Reserve in paygrades E2 or above for non-prior service males appears to lower the probability of attrition to all destinations during the first two years of service. Entering in paygrades E5 or above for prior service males, appears to lower the probability of attrition during the first two years, while entering in paygrades E1--E3 is not significant. Term of enlistment was significant for non-prior service males only in the pre-training/training and the post-training models: the three-year term of enlistment was associated with lower probabilities of attrition during training, but with higher probabilities of attrition after training. For prior service males, one- to five-year terms of enlistment were significantly associated with lower attrition in both models (relative to six-year term of enlistment). Finally, the cohort year group of entry (both fiscal year 1981 and fiscal year 1982) consistently lowered attrition probabilities in the prior service group, but raised attrition probabilities in the non-prior service group for the pre-training/training and post-training models.

Although the results discussed in this chapter have provided some (limited) insight into the nature of the attrition process for non-prior and prior service reservists, inconsistencies in the findings, counter-intuitive findings (such as the probabilities associated with Mental Category IV--V), and a global lack of explanatory power in all the model specifications, preclude definitive interpretation of these results. In fact, given the large sample sizes utilized in this study, it is likely that significant regression coefficients reflect merely the sensitivity of the logist regression procedure to very slight variability in the probability of attrition. The following and final chapter of this thesis accordingly addresses methodological difficulties encountered and recommendations for the enhancement of future research efforts.

V. CONCLUSIONS AND RECOMMENDATIONS

A. CONCLUSIONS

The regression models discussed in Chapter IV were developed to investigate the nature of and relationships among potentially significant determinants of attrition. While the personal and occupational factors entered into the various timing and destination model specifications were found to be significant at p.05, the overall explanatory power (R^2) of each model was minimal, ranging from .008 to .088. (In the logist regression technique, R^2 is actually the proportion of log-likelihood [see Equation 4.3] explained by the model. This statistic is calculated by division of a corrected model chi-square statistic by the product of [-2] times the maximum log-likelihood of attrition with intercepts only in the model.) Because measures of overall explanatory power have typically not been included in reports of previous attrition research, it is not possible to make direct comparisons of these results with those of previous studies. In any event, strong predictive capability is not indicated by these results; and hence, no conclusions relative to reserve force personnel management (e.g., market-oriented recruitment strategies; recruit selection procedures; and training, assignment, and transfer policies) can be supported by this study.

The deficit of explanatory power evidenced in the analytical results, can be traced to limitations imposed by the data base utilized in this study and also, to some extent, the model specifications applied in the regression analyses. As discussed in Chapter III, the DMDC cohort files consisted primarily of data elements (biodemographic and occupational characteristics) applicable to the date of Selected Reserve entry for each reservist. Subsequent matches to the reserve master personnel files were performed

annually, such that intervening changes in attributes were not available in the data base. Additionally, these annual matches were limited to eight data elements (prior service status, service, reserve category, training/pay category, term of enlistment, paygrade, occupational code, and home of residence state), thus providing little continuity of information on occupational attributes and no continuity of information on personal attributes. Similarly, the lack of information concerning reserve unit characteristics (type of unit, size of unit, and net drill time), was compounded by inability to track changes in unit-specific organizational policies, such as those governing transfers to the IRR in cases of non-participation. Since instability in life situations (e.g., changes in marital status, relocation, etc.) may well influence the reservist's decisions relative to reserve force participation, it is likely that exclusion of such change factors from the analysis degraded the explanatory power of the models. As stated by Grissmer and Kirby in their study of the fiscal year 1980 non-prior service cohort:

> These high levels of attrition are partially explained by intercomponent and active transfers, the quality of enlistees, and the turbulence of the civilian lives of individuals during the formative period of labor force entry and family formation. [Ref. 10: p. 43]

The economic theory of moonlighting (see Chapter II) suggests that other factors (specifically, those which affect an individual's relative valuation of market wage and leisure activity) are also operative determinants of labor market participation, including secondary employment. These factors include characteristics of the civilian work environment, such as the unemployment rate and the nature of the reservist's primary occupation (type and size of firm, wage rate, availability of overtime, etc.); as well as attributes of the reservist's particular financial situation, such as

receipt of unearned income, spouse's earnings, and level of living expenses. These economic factors were not, however, investigated in this study, since: 1) the data base did not include information on civilian employment, and 2) the inability to trace UIC to unit location (see Chapter III) precluded file matching to extant market data files.

The candidate independent variables, then, did not access a number of potentially relevant determinants of attrition behavior, particularly with regard to the nature and timing of changes in personal attributes, as well as characteristics of the primary civilian employment and particulars of the reserve service. The model specifications developed from the limited data for the regression analyses were accordingly incomplete and additionally accounted for only the main effects of candidate independent variables (i.e., interactions among the variables were not addressed).

The construction of the dependent loss variable may also have contributed to the lack of explanatory power in the regression analyses. The loss records associated with each reservist were limited in terms of the data elements recorded at the time of loss, and therefore did not reflect intervening changes in the reserve service status of each member. If, for example, an individual transferred to the IRR and then subsequently re-enlisted in the Selected Reserve during the same fiscal year, the date of regain would not be represented in the data base. Hence, although any later loss from Selected Reserve service would be recorded in the second loss field associated with that individual, it would not be possible to determine the individual's total length of service and therefore whether or not the second loss was as unprogrammed loss.

For this reason, the attrition outcome used in this study was constructed from data in the first loss field of each record, and subsequent losses were excluded from the analysis. As a result, the parameters of the attrition

criterion as presented in Chapters III and IV, may not have provided an accurate representation of actual attrition behavior--losses to civilian life, if preceded by unit or reserve component transfers, were not captured.

B. RECOMMENDATIONS

It is apparent from the above discussion that an improved management information system for tracking reservists would contribute significantly to future research on attrition from the Selected Reserve. This capability is inherent in the Standard Installation/Division Personnel System (SIDPERS) management information system [Ref. 36].

This system is designed to support personnel management at all levels of the USAR, in five major functional areas: personnel distribution, deployment, sustainment, personnel development, and separation. Central operation of the system is supported by the Reserve Components Personnel and Administration Center (RCPAC) in St. Louis, Missouri. The primary system users are Major Army Commands (MACOM's), Major Army Subcommands (SUBMACOM's), Major U.S. Army Reserve Commands (MUSARC's), and Troop Program Units (TPU's). Computer centers at each Continental U. S. Army (CONUSA) serve as field operating centers for data entry, with on-line interactive capability available at the MUSARC and SUBMACOM levels.

Source data entry (i.e., data other than top-loaded files from other automated information systems) is event driven: transaction records are generated at the TPU level as a result of actions or events which affect or change organization and personnel data. These transaction records are submitted daily to the appropriate data entry point (MUSARC's or SUBMACOM's) and entered into the system, where both validity and compatibility edits are performed in preparation for weekly updating of the data base.

The data base itself consists of: organization data (unit identity, status, type, and location), authorization

data (TPU position descriptors), MOS data (valid specialty and skill identifiers), and personnel data (personal information, current status, service history, qualification, and unit assignment data). Summary output from the system is exportable to functional users through report generation (paper and microform), on-line terminal display, and magnetic tape storage.

Construction of longitudinal personnel files from SIDPERS would mitigate the analytical deficiencies discussed in Section (A) of this chapter, both by providing more complete profiles of Selected Reserve personnel and by facilitating linkages to other data files for augmentation of the data base. Table XXV displays data elements available within the SIDPERS data base relative to biodemographic and occupational characteristics. By monitoring and recording "changeable" attributes on a quarterly basis, longitudinal files would provide a more continuous representation of personal and occupational status. Similarly, refinement in the definition of attrition, per se, could be achieved through maintenance of the amplified loss information shown in Table XXVI.

As discussed in Chapter II, both theories of turnover behavior and the previous research findings suggest that cognitive or perceptual attributes play an important role in the attrition process. The longitudinal files could be enriched by file matching (keyed to social security number) to, for example, survey information on individual background factors and motivations at the time of enlistment, thereby providing more comprehensive information on socioeconomic background, individual work experience, job satisfaction, entry point decisions, and alternatives to military service [Ref. 26: p. 25].

The 1979 Reserve Force Studies Surveys are one source of this type of survey information. This survey of both non-prior and prior service personnel was conducted by the Rand

TABLE XXV

STANDARD INSTALLATION/DIVISION PERSONNEL SYSTEM--USAR
BIODEMOGRAPHIC AND OCCUPATIONAL DATA ELEMENTS

Personal Data

Social security number

Individual location data:

- Home of record city
- Home of record state
- Home of record zip code

Demographic data:

- Date of birth
- Sex
- Marital status
- Number of dependents
- Race
- Ethnic group

Civilian occupational category

Service Data

Individual status data:

- Reserve component category
- Reason entry present category
- Date entry present category
- Record status code (active or inactive)
- Date of record status

Personnel status data:

- Suspense favorable personnel action reason[1]
- Date suspense favorable personnel action

Pay entry base date

Grade data:

- Current grade
- Date of grade
- Date eligible for promotion

Retention data:

- Individual incentive status
- Status effective date
- Qualitative/selective retention code

(1) Basis for suspending favorable personnel action (promotion, etc.), such as Uniform Code of Military Justice offenses, failure to meet requirements of Weight Control Program, etc.

Table XXV

STANDARD INSTALLATION/DIVISION PERSONNEL SYSTEM--USAR
BIODEMOGRAPHIC AND OCCUPATIONAL DATA ELEMENTS (cont'd.)

Service history:

- Date of initial entry to military service
- Date last released from active duty
- Prior active duty indicator
- Date of initial entry to Reserves
- Date of current enlistment
- Date of expiration of statutory military obligation
- Date of expiration of TPU obligation
- Number of extensions of enlistment
- Cumulative months of extension

Qualification Data:

- Military personnel classification[2]
- Primary military occupational specialty
- Skill level
- Specialty skill identifier
- Additional skill identifier
- Military education completed status
- Civilian education level completed
- Civilian education certificate completed
- Training option Reserves (non-prior service)
- AFQT percentile score
- Skill qualification test MOS
- Physical readiness test indicator

Assignment history:

- Date of assignment to current UIC
- Duty military occupational code
- Duty qualification code[3]
- Projected date of departure
- Previous UIC
- Date of assignment to previous UIC
- Previous date of departure

Unit Data

Unit identification data:

- Unit identification code
- Unit name (abbreviated)
- MTOE or TDA Number[4]
- UIC effective date

(2) Enlisted, officer, warrant officer, or officer training corps student.

(3) Commander's evaluation of individual's ability to perform the duties of position to which assigned.

(4) Number of the authorization document under which a unit is organized.

Table XXV

STANDARD INSTALLATION/DIVISION PERSONNEL SYSTEM--USAR BIODEMOGRAPHIC AND OCCUPATIONAL DATA ELEMENTS (cont'd.)

Unit location data:

- Unit city
- Unit state
- Unit zip code

Unit type data:

- DA organization class
- Type organization code (interim)
- Troop program sequence number
- Functional category code
- Standard requirements code

Required strength

Authorized strength

Assigned strength

(5) Groups units by mission, type, and size.

Corporation for the Office of the Deputy Assistant Secretary of Defense (Reserve Affairs) and is currently held at DMDC. The general topic areas covered by the survey are given in Table XXVII. In addition, unit attributes and aspects of the command organizational climate could be investigated by incorporating the commander and unit surveys depicted in Table XXVIII and in Table XXIX. [Ref. 37]

The obvious drawback to the Reserve Force Studies Surveys, of course, is that information for only one fiscal year (1979) is available. A more useful survey might be the Reserve Component Attitude Study. Unlike the Reserve Force Studies, this is an annual series designed to survey the propensity of individuals to enlist in the Selected Reserves. Both prior and non-prior service personnel are included in the survey, and it is designed to capture data on civilian labor force status, civilian compensation and hours worked, and family and employer characteristics. It should be noted, however, that the data is collected by

TABLE XXVI

STANDARD INSTALLATION/DIVISION PERSONNEL SYSTEM--USAR LOSS-RELATED DATA ELEMENTS

Effective date of loss (month and year)

Reason for loss code:

- Resignation (officers only)
- Discharge[1]
- Mandatory removal[2]
- Losses within military:
  - Transfer to active component
  - Transfer to other reserve component
  - Reassignment to IRR
  - Reassignment to Standby Reserve
  - Reassignment to Retired Reserve
- Miscellaneous (death, etc.)

(1) By nature of discharge action: expiration of enlistment obligation, failure to reply to official correspondence, inability to locate, not available for active military service, physical disqualification, failure to complete training, personal hardship, dependency, misconduct, unsuitability, etc.

(2) By nature of removal action: failure to maintain active status, maximum age, length of service, not selected for promotion, grade level of position not available, etc.

telephone and pertains to individuals who are not currently in the Selected Reserves. (Further, only individuals who are willing to give their social security numbers and who subsequently joined the Reserves, would be germane to studies of Selected Reserve attrition.) [Ref. 38] Periodic collection of survey information in conjunction with recruitment procedures would, of course, provide the optimal source of information concerning individual background factors and motivations.

Matched data from these types of surveys, then, could be exploited to investigate behavioral relationships between demographic characteristics and attrition behavior, and to

TABLE XXVII

1979 RESERVE FORCE PERSONNEL SURVEY
QUESTIONNAIRE CONTENTS

Contents of Personnel Questionnaire

Individual background
Educational background
Marital history and number of children
Family background
Civilian labor force experience
Family resources
Military background
Military training and work
Enlistment decision/process
Military compensation and benefits
Military plans
Military attitudes/opinions
Leisure time activities

provide insight concerning which individuals are high attrition risks. Similarly, data concerning economic conditions (see Section (A), above) could be accessed by matching geographic elements in the files (city, state, zip code) to extant files of economic indicators by census region and district. Examples of such files are the U.S. Bureau of Census Current Population Survey files of data on civilian part-time and dual job holding, unemployment rates, and metropolitan commuting patterns; and the Center for Naval Analysis National Manpower Inventory file of data on civilian/military occupational codes and student populations (college and vocational-technical) by geographic areas. Geographic data elements would also enable construction of an index for distance travelled to the unit for drill activity, by matching residence zip code with unit zip code.

A longitudinal data base constructed in this manner would provide both the scope and continuity of information

TABLE XXVIII

1979 RESERVE FORCE COMMANDER SURVEY
QUESTIONNAIRE CONTENTS

Contents of Commander Questionnaire

Individual background
Marital history and number of children
Civilian labor force experience
Family resources
Military background
Military training and work
Military compensation and benefits
Military plans
Military attitudes/opinions
Evaluation of unit personnel
Unit drill and annual training activities, evaluations
Commander's guard/reserve activities

TABLE XXIX

1979 RESERVE FORCE UNIT SURVEY
QUESTIONNAIRE CONTENTS

Contents of Unit Questionnaire

General unit characteristics
Unit drill and annual training activities, schedule
Characteristics of unit drill location
Unit personnel, current
Unit E1-E9 personnel, FY79
An attrition case history--unprogrammed loss, 1st term
Military benefits
Unit performance

necessary to support attrition studies. Future research, utilizing regression, survival function, and other multivariate techniques (e.g., discriminant analysis), could accordingly access a broad range of factors potentially relevant

to attrition: biodemographic, occupational, cognitive/affective/perceptual, and economic factors. Additionally, alternative model specifications could be manipulated to investigate, for example, male versus female population characteristics and interactions among the candidate independent variables. Finally, inclusion of measures of explanatory power (R^2) in reports of research findings, would facilitate comparison among and evaluation of attrition studies. The results of such studies, then, would ultimately enhance understanding of the attrition process and illuminate attendant policy implications for reserve force personnel management.

APPENDIX A

FREQUENCIES AND CONDESCRIPTIVES, NON-PRIOR SERVICE

Characteristic	Absolute Frequency	Relative Frequency
Sex		
Male	13734	71.16
Female	5565	28.84
Race		
Caucasian	14100	73.31
Black	4407	22.91
Hispanic	270	1.40
Other	457	2.38
Marital Status		
Single	9937	82.36
Married	2128	17.64
Number of Dependents		
None	10013	82.99
One	751	6.23
Two or more	1301	10.78
Age at Entry		
17--19 years	12440	64.46
20--24 years	5203	26.96
25 or more years	1656	8.58
	Mean: 19.66 Std Dev: 3.22 Min: 17 Max: 35	
Education		
Attending H.S.	2357	12.21
Non-H.S. graduate	7108	36.83
GED	3181	16.48
H.S. degree or more	6652	34.47
Mental Category		
I	489	2.59
II	3802	20.11
IIIA	2648	14.00
IIIB	6354	33.60
IV-V	5616	29.70
	Mean: 3.68 Std Dev: 1.17 Min: 1 Max: 5	

Appendix A (cont'd.)

Characteristic	Absolute Frequency	Relative Frequency
Cohort Year		
1980	5642	29.79
1981	5936	31.34
1982	7360	38.86
Term of Enlistment		
1 year	0	0.00
2 years	0	0.00
3 years	2395	12.41
4 years	126	0.65
5 years	2	0.01
6 years	16773	86.93
	Mean: 5.61 Std Dev: 0.99 Min: 3 Max: 6	
Paygrade at Entry		
E1	17849	92.49
E2	197	1.02
E3-9	1252	6.49
	Mean: 1.15 Std Dev: 0.53 Min: 1 Max: 7	

APPENDIX B

FREQUENCIES AND CONDESCRIPTIVES, PRIOR SERVICE

Characteristic	Absolute Frequency	Relative Frequency
Sex		
Male	19282	90.42
Female	2044	9.58
Race		
Caucasian	13344	70.90
Black	4796	25.84
Hispanic	146	0.79
Other	272	1.47
Marital Status		
Single	5789	39.24
Married	8965	60.76
Number of Dependents		
None	5679	38.49
One	2568	17.41
Two or more	6507	44.10
Age at Entry		
17--19 years	209	1.11
20--24 years	8151	43.41
25 or more years	10417	55.48
	Mean: 27.33 Std Dev: 6.28 Min: 17 Max: 60	
Education		
Attending H.S.	17	0.09
Non-H.S. graduate	2573	13.86
GED	983	5.29
H.S. degree or more	14989	80.75
Mental Category		
I	886	5.49
II	4695	29.12
IIIA	2388	14.81
IIIB	3373	20.92
IV-V	4779	29.65
	Mean: 3.41 Std Dev: 1.33 Min: 1 Max: 5	

Appendix B (cont'd.)

Characteristic	Absolute Frequency	Relative Frequency
Cohort Year		
1980	6449	31.52
1981	7051	34.46
1982	6962	34.02
Term of Enlistment		
1 year	4683	26.65
2 years	431	2.54
3 years	1960	11.15
4 years	98	0.56
5 years	31	0.18
6 years	10370	59.01
	Mean: 4.22 Std Dev: 2.22 Min: 1 Max: 6	
Paygrade at Entry		
E1	446	2.09
E2	1308	6.13
E3	3337	15.65
E4	9645	45.23
E5	4454	20.89
E6	1441	6.76
E7-9	694	3.25
	Mean: 4.11 Std Dev: 1.18 Min: 1 Max: 9	

APPENDIX C

FREQUENCIES OF SURVIVORS, FY80 COHORTS

Months of Drill Unit Service	Non-Prior Service[1]	Prior Service
0 (N)	5642	6449
1	5518	6443
2	5460	6433
3	5406	6400
4	5342	6347
5	5304	6281
6	5261	6201
7	5214	6131
8	5184	6063
9	5152	6001
10	5120	5950
11	5081	5924
12	5051	5898
13	5030	5875
14	5009	5856
15	4981	5829
16	4948	5800
17	4929	5768
18	4914	5739
19	4897	5717
20	4879	5699
21	4862	5683
22	4847	5663
23	4837	5659
24	4829	5652

1) Months of service for non-prior service reservists represent time served after completion of initial training and while assigned to a drilling unit: Months of drill unit service = Months of service - Average length of training (5 months).

APPENDIX D

FREQUENCIES OF SURVIVORS, FY81 COHORTS

Months of Drill Unit Service	Non-Prior Service[1]	Prior Service
0 (N)	5936	7051
1	5830	7047
2	5772	7041
3	5714	7018
4	5638	6976
5	5585	6901
6	5536	6834
7	5494	6755
8	5447	6690
9	5411	6642
10	5381	6588
11	5355	6567
12	5325	6544
13	5305	6519
14	5276	6498
15	5255	6478
16	5233	6456
17	5217	6438
18	5204	6409
19	5188	6383
20	5174	6368
21	5163	6349
22	5145	6338
23	5134	6335
24	5113	6332

1) Months of service for non-prior service reservists represent time served after completion of initial training and while assigned to a drilling unit: Months of drill unit service = Months of service - Average length of training (5 months).

APPENDIX E

FREQUENCIES OF SURVIVORS, FY82 COHORTS

Months of Drill Unit Service	Non-Prior Service[1]	Prior Service
0 (N)	7360	6962
1	7263	6956
2	7172	6945
3	7099	6923
4	7025	6881
5	6964	6831
6	6911	6779
7	6859	6718
8	6812	6657
9	6769	6609
10	6734	6553
11	6694	6543
12	6657	6535
13	6640	6527
14	6610	6512
15	6580	6497
16	6555	6485
17	6521	6472
18	6502	6454
19	6475	6435
20	6451	6431
21	6409	6423
22	6359	6416
23	6266	6414
24	6197	6411

1) Months of service for non-prior service reservists represent time served after completion of initial training and while assigned to a drilling unit: Months of drill unit service = Months of service - Average length of training (5 months).

APPENDIX F

BIVARIATE TESTS OF STAYER/LEAVER STATUS, NON-PRIOR SERVICE

Variable	Chi-Square Statistic	DF	Prob.
	In-Training Stayer vs. Leaver		
Sex	122.44	1	.0001
Race	5.33	3	.1493
Marital Status	69.37	1	.0001
Number of Dependents	57.37	2	.0001
Age at Entry	92.41	2	.0001
Education	116.17	3	.0001
Mental Category	26.26	4	.0001
Cohort Year	44.78	2	.0001
Term of Enlistment	86.69	2	.0001
Paygrade at Entry	1.45	2	.4843
	0--6 Month Stayer vs. Leaver		
Sex	20.14	1	.0001
Race	8.18	3	.0424
Marital Status	18.94	1	.0001
Number of Dependents	16.27	2	.0003
Age at Entry	11.98	2	.0025
Education	141.10	3	.0001
Mental Category	45.90	4	.0001
Cohort Year	3.84	2	.1469
Term of Enlistment	19.62	3	.0002
Paygrade at Entry	6.98	2	.0305
	6--12 Month Stayer vs. Leaver		
Sex	118.79	1	.0001
Race	3.47	3	.3252
Marital Status	10.33	1	.0016
Number of Dependents	3.76	2	.1526
Age at Entry	11.37	2	.0034
Education	94.97	3	.0001
Mental Category	46.68	4	.0001
Cohort Year	4.96	2	.0839
Term of Enlistment	10.56	3	.0144
Paygrade at Entry	5.88	2	.0528

Appendix F (cont'd.)

Variable	Chi-Square Statistic	DF	Prob.
13--18 Month Stayer vs. Leaver			
Sex	27.35	1	.0001
Race	2.77	3	.4278
Marital Status	4.84	1	.0278
Number of Dependents	3.66	2	.1604
Age at Entry	0.23	2	.8899
Education	14.99	3	.0018
Mental Category	9.11	4	.0583
Cohort Year	0.84	2	.6564
Term of Enlistment	3.38	3	.3369
Paygrade at Entry	3.39	2	.1839
19--24 Month Stayer vs. Leaver			
Sex	7.09	1	.0077
Race	4.32	3	.2292
Marital Status	0.24	1	.6276
Number of Dependents	3.56	2	.1678
Age at Entry	1.54	2	.4638
Education	6.47	3	.0909
Mental Category	0.63	4	.9596
Cohort Year	4.02	2	.1341
Term of Enlistment	1.84	3	.6060
Paygrade at Entry	0.25	2	.8801
0--24 Month Stayer vs. Leaver			
Sex	174.6	1	.0001
Race	12.9	3	.0048
Marital Status	31.9	1	.0001
Number of Dependents	22.9	2	.0001
Age at Entry	14.5	2	.0007
Education	198.0	3	.0001
Mental Category	83.45	4	.0001
Cohort Year	2.15	2	.3419
Term of Enlistment	30.03	3	.0001
Paygrade at Entry	13.27	2	.0013

APPENDIX G

BIVARIATE TESTS OF STAYER/LEAVER STATUS, PRIOR SERVICE

Variable	Chi-Square Statistic	DF	Prob.
	0--6 Month Stayer vs. Leaver		
Sex	17.34	1	.0001
Race	13.69	3	.0034
Marital Status	14.53	1	.0001
Number of Dependents	20.88	2	.0001
Age at Entry	52.85	2	.0001
Education	24.35	3	.0001
Mental Category	16.05	4	.0030
Cohort Year	16.92	2	.0001
Term of Enlistment	123.04	5	.0001
Paygrade at Entry	60.93	6	.0001
	6--12 Month Stayer vs. Leaver		
Sex	11.66	1	.0006
Race	6.34	3	.0963
Marital Status	28.16	1	.0001
Number of Dependents	34.97	2	.0001
Age at Entry	66.77	2	.0001
Education	3.64	3	.3028
Mental Category	18.15	4	.0012
Cohort Year	15.56	2	.0004
Term of Enlistment	61.79	5	.0001
Paygrade at Entry	31.42	6	.0001
	13--18 Month Stayer vs. Leaver		
Sex	4.35	1	.0370
Race	10.03	3	.0183
Marital Status	38.51	1	.0001
Number of Dependents	40.64	2	.0001
Age at Entry	65.48	2	.0001
Education	10.93	3	.0121
Mental Category	20.71	4	.0004
Cohort Year	23.77	2	.0001
Term of Enlistment	165.29	5	.0001
Paygrade at Entry	31.93	6	.0001

Appendix G (cont'd.)

Variable	Chi-Square Statistic	DF	Prob.
	19--24 Month Stayer vs. Leaver		
Sex	3.92	1	.0479
Race	8.32	3	.0399
Marital Status	31.85	1	.0001
Number of Dependents	28.83	2	.0001
Age at Entry	74.24	2	.0001
Education	14.91	3	.0019
Mental Category	18.25	4	.0011
Cohort Year	20.64	2	.0001
Term of Enlistment	67.65	5	.0001
Paygrade at Entry	21.24	6	.0017
	0--24 Month Stayer vs. Leaver		
Sex	39.58	1	.0001
Race	22.45	3	.0001
Marital Status	102.21	1	.0001
Number of Dependents	119.96	2	.0001
Age at Entry	240.57	2	.0001
Education	43.26	3	.0001
Mental Category	61.98	4	.0001
Cohort Year	73.07	2	.0001
Term of Enlistment	364.64	5	.0001
Paygrade at Entry	142.88	6	.0001

APPENDIX H

REGRESSION ANALYSIS

Attrition Criterion: Losses to civilian life
First two years in service

Characteristic	Non-Prior Service ($N=13627$, $R^2=.010$) Regression Coefficient	Prob.	Prior Service ($N=16018$, $R^2=.039$) Regression Coefficient	Prob.
Race				
Black	-0.18	.0035	0.01	.8483
Other	-0.25	.0422	-0.14	.4223
Married	0.16	.0592	0.03	.8430
Age at Entry				
17 years	-0.20	.0011	1.34	.1528
20--24 years	0.14	.0236	0.11	.5855
24 or more years	0.26	.0177	-0.06	.7875
Education				
Non-H.S. graduate	0.26	.0000	0.05	.4901
GED	0.52	.0000	-0.10	.4592
Mental Category				
I	-0.57	.0008	-0.36	.0190
II	-0.41	.0000	-0.38	.0000
IIIA	-0.19	.0140	-0.27	.0014
IV--V	-0.18	.0014	-0.34	.0000
One to five year term of enlistment	---	--	-0.91	.0000
PAYGrade E1--E3	---	--	-0.12	.0515
PAYGrade E5--E9	---	--	-0.21	.0024
Some dependents	---	--	-0.02	.8952
Cohort Year				
1981	---	--	-0.19	.0013
1982	---	--	-0.29	.0000

APPENDIX I

REGRESSION ANALYSIS

Attrition Criterion: Losses to civilian life, other Reserve components, and active duty First two years in service

Characteristic	Non-Prior Service ($N=13627$, $R^2=.043$) Regression Coefficient	Prob.	Prior Service ($N=16018$, $R^2=.088$) Regression Coefficient	Prob.
Race				
Black	0.79	.1021	0.04	.2980
Other	-0.13	.1709	-0.23	.0627
Married	0.27	.2358	0.04	.7572
Age at Entry				
17 years	-0.22	.0000	0.20	.8259
20--24 years	0.10	.0321	0.03	.8192
24 or more years	0.07	.4517	-0.34	.0190
Education				
Non-H.S. graduate	0.49	.0000	0.38	.0000
GED	0.94	.0000	0.03	.7674
Mental Category				
I	-0.76	.0000	-0.23	.0280
II	-0.47	.0000	-0.17	.0008
IIIA	-0.24	.0001	-0.01	.8415
IV--V	-0.22	.0000	0.01	.8848
Three year term of enlistment	0.52	.0000	---	--
One to five year term of enlistment	---	--	-1.05	.0000
PAYGrade E2--E9	-0.25	.0081	---	--
PAYGrade E1--E3	---	--	0.01	.8785
PAYGrade E5--E9	---	--	-0.12	.0176
Some dependents	-0.28	.2116	-0.17	.1417
Cohort Year				
1981	0.03	.5353	-0.20	.0000
1982	0.20	.0001	-0.15	.0007

APPENDIX J

REGRESSION ANALYSIS

Attrition Criterion: Losses to civilian life
Pre-training and training

Characteristic	Non-Prior Service (N=13627) R^2=.008 Regression Coefficient	Prob.
Race		
Black	-0.16	.1084
Other	-0.04	.8310
Married	0.84	.0663
Age at Entry		
17 years	0.25	.0034
20--24 years	0.02	.7962
24 or more years	-0.09	.6117
Education		
Non-H.S. graduate	0.18	.0721
GED	0.05	.6904
Mental Category		
I	0.06	.7689
II	-0.12	.2189
IIIA	0.21	.0406
IV--V	-0.14	.1370
Three year term of enlistment	-0.24	.0377
PAYGrade E2--E9	0.10	.5240
Some dependents	-0.71	.1216
Cohort Year		
1981	0.42	.0000
1982	0.52	.0000

APPENDIX K

REGRESSION ANALYSIS

Attrition Criterion: Losses to civilian life Post-training to two years in drill service

Characteristic	Non-Prior Service ($N=13627$) $R^2=.016$ Regression Coefficient	Prob.
Race		
Black	-0.08	.2617
Other	-0.29	.0618
Married	0.18	.0735
Age at Entry		
17 years	-0.33	.0000
20--24 years	0.10	.1698
24 or more years	0.36	.0052
Education		
Non-H.S. graduate	0.37	.0000
GED	0.59	.0000
Mental Category		
I	-0.79	.0010
II	-0.48	.0000
IIIA	-0.28	.0056
IV--V	-0.10	.1388

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